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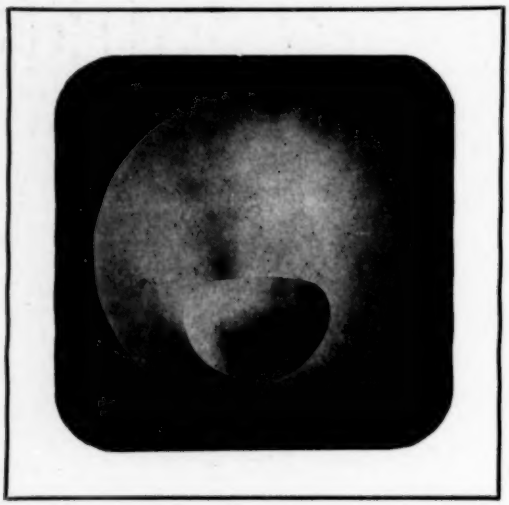

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AMERICAN JOURNAL OF OPHTHALMOLOGY
VOLUME 16 SEPTEMBER, 1933 NUMBER 9

ANGIOID STREAKS OF THE FUNDUS OCULI

T. WASSENAAR, M.D.
PRETORIA, SOUTH AFRICA

Two cases of this ocular condition are reported together with a discussion of the theories advanced for its explanation. The author's opinion is that "due to an anomaly of development, abnormal vessels find their way between the two blades of the embryological eye."

Since Doyne[1] in 1889 and Plange[2] in 1891 (the latter on a case which he had observed from 1879) published the first descriptions of this peculiar disease of the fundus oculi, a large number of cases have been reported. Up to the present, unluckily, no undoubted cases have been microscopically examined, so that practically all the theories explaining the cause of these angioid streaks are still very problematical. For that reason any new case that might throw more light on the subject is worth recording.

Two cases, one of which presents some special features, came under my observation during the last two years.

Case 1. P. A. G., a European male, aged 38 years, a farmer by occupation, consulted me in October, 1930, on account of an injury to the left eye, which had caused an immediate marked failing of the vision of that eye. In chopping wood a small piece had been flung up, hitting his left eye and causing the complaint for which he came to see me. The sight of the injured eye had been good before the accident.

On examination a few days after the accident a small opacity of recent origin on the temporal side of the cornea marked the spot where the piece of wood had struck the eyeball. There was still a faint ciliary injection. A slight degree of iridonesis in the upper temporal part of the iris, showed that the lens had been dislocated a little in that area. The fundus of the injured eye was covered with large patches of subretinal hemorrhages, of a bright red color, mostly with well-defined margins and disseminated over practically the whole fundus (fig. 1). The retinal vessels ran smoothly over these hemorrhages. In between the latter, around the papilla,

Fig. 1 (Wassenaar). Case 1. Subretinal hemorrhages. Angioid streaks. A large one, with vessel-like appearance, on nasal side, disappears under subretinal hemorrhage, to reappear on the other side. Left eye.

and at one spot on the temporal side of the papilla, visible underneath a thin layer of blood, irregularly shaped streaks with brownish color could be seen and were recognized as the so-called angioid streaks. They appeared as bands and lines mostly, but at some places assumed a definite blood-vessel shape. Running from the papilla on the nasal side one could see such a vessel-

shaped structure of very wide calibre disappearing under a subretinal hemorrhage and emerging again on the peripheral margin of the latter. Another such streak, of similar bright red color (not as bright as that of an artery, but not so dark as that of a vein), very regularly shaped, with smooth edges, and branching towards the periphery, could be seen on the temporal side and down. The central area

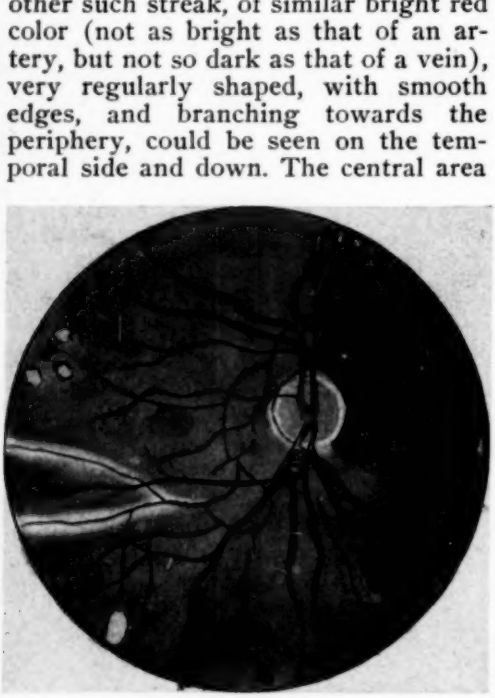

Fig. 2 (Wassenaar). Case 1. Angioid streaks, some lined by white bands of choroiditis, others leading to patches and dots of choroiditis. On nasal side large vessel-like streaks converging into a sinus at the papilla. The sinus, as pictured, is relatively a little too large. Right eye.

was covered by a large hemorrhage. Patches of choroiditis were visible at several spots, mostly in the outer parts of the fundus.

Examining the other eye, a much clearer picture was presented (fig. 2). Here the same streaks could be observed, mostly lineshaped, anastamosing frequently round the papilla, spreading and branching towards the periphery of the fundus, and leading often to foci of choroiditis in that area. Below the macula two such streaks, lined on both sides by continuous white bands, were noticed. Otherwise the patches of choroiditis were mostly pigmented at their margins. Here and there they appeared as accumulations of brownish pigment only.

What was most interesting, however, in the fundus image of this eye, was the presence, next to the papilla, of a sinus, as it were, into which several large streaks of undoubted vessel-like appearance converged. This finding, combined with the fact that some of the line-shaped streaks anastamosed with these vessel-like structures at several places, left no doubt but that the latter and the ordinary streaks belonged to the same system and that they were all, in reality, nothing else but blood vessels.

When I saw the patient again several months after the injury, the hemorrhages had completely disappeared in the left eye, but the central area was covered by a white star-shaped membrane, a condition that has been frequently described as the ultimate result in cases of angioid streaks. The area adjoining the papilla on the temporal side was also occupied by a large

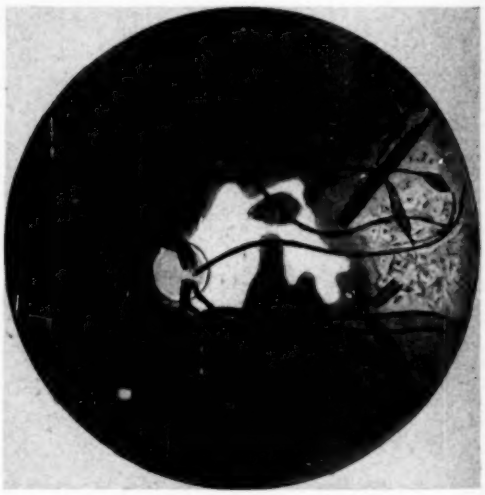

Fig. 3 (Wassenaar). Case 1. The same fundus as in figure 1, but several months later. A large white area occupies the fundus on the temporal side of the papilla and in the macular region. Large vessel-like streaks are now visible.

white patch. In the remainder of the fundus several large vessel-like structures could be observed, most of which seemed to run dead against that area of the fundus which was most damaged by the previous hemorrhages. Here and there some brownish streaks

connected these vessel-like structures with each other. On the nasal side the same large "vessel" which some months previously had disappeared under a hemorrhage could be followed uninterruptedly. The fundus on the temporal side of the central area, was occupied by small dots of blackish pigment and a kind of reticulum, which seemed to be a network of streaks. Some of the "vessels" running upwards above the white area were lined here and there by strips and dots of black pigment.

None of these "vessels" showed a light reflex and they could not be obliterated by mild pressure on the eyeball. In view of the fact that even very slight traumata may lead to hemorrhage in such eyes, it was naturally deemed advisable not to press too hard on the eyeball.

The fundi of two sons (aged 12 and 14) of this patient, showed nothing abnormal.

Case 2. The fundi of this patient, a European male, aged 56 years, also a

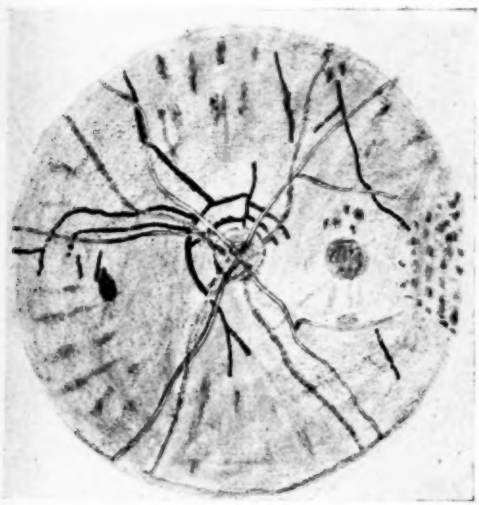

Fig. 4 (Wassenaar). Case 2. Angioid streaks. Disc-shaped exudate in central area. Left eye.

farmer, presented no special features. The patient consulted me on account of a central scotoma of the left eye, which had appeared some little while back. In the macular area there was a definite, pale yellowish exudate, slightly elevated, of disc shape, part of which was covered with a fading hemorrhage. The streaks were of the ordinary well-known type, except that for short stretches in the right eye, they assumed a red vessel appearance (figs. 4 and 5).

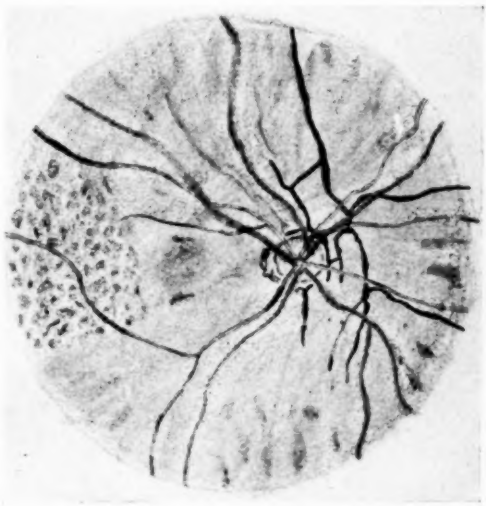

Fig. 5 (Wassenaar). Case 2. Angioid streaks. Dots of brown pigment on temporal side of central area. Right eye.

On inquiry it was found that this patient was a distant relative of the patient in case 1. According to his statement the mother of the first patient was his second niece.

A brother of the first patient is said to have very bad eyesight, but I have not yet had the opportunity of examining him. Both patients live about 100 miles away, and it is exceedingly difficult to get their relatives in for examination.

All authors agree that the angioid streaks resemble blood vessels, and as the ophthalmoscopic aspect of the present case 1 is so perfectly clear and convincing on this point, there seems to my mind to be no doubt but that the streaks are, in fact, blood vessels, abnormal blood vessels, due to an anomaly of development, as I will attempt to explain farther on.

The disease afflicts males and females equally, it is frequently familial and hereditary, and always bilateral. Although most of the cases described

concerned patients of about 40 years of age, it must not be forgotten that in all of these the disease was only then discovered and in some of them accidentally. As yet no author has observed the very beginning of the angioid streaks. And even though some more streaks, as in the case of Coppez and Danis[3], have been noticed to appear during the course of years, this does not prove that the underlying anatomical structure was not present from early childhood or even birth. In view of the fact that angioid streaks have been found at the early age of 16 years (Hughes[4]) and 9 years (Bachsinjan-Frenkel[5]), and in view of the frequent co-existence of angioid streaks with pseudoxanthoma elasticum of the skin, a disease which seems to have some mysterious relationship with the ocular condition and occurs even in children 4 years of age, it is not unreasonable to assume that a congenital anomaly forms the basis of the angioid streaks. Any theory attempting to explain the existence of angioid streaks must be able to account for the following features of the disease:

(a) the undoubted vessel-like appearance in many instances, especially in the earlier stages (see Coppez and Danis);

(b) the frequent hemorrhages that occur spontaneously and after the slightest traumata;

(c) the bands of retinochoroiditis along some of the streaks;

(d) The patches and areas of choroiditis frequently found beyond the peripheral ends of the streaks;

(e) The frequent affection of the macular area;

(f) The localization of the streaks in the outer layers of the retina;

(g) The inclination of the streaks to become thinner and to branch towards the periphery;

(h) The familial and hereditary occurrence of the affection;

(i) Its relationship to pseudoxanthoma elasticum.

Let us first see in how far some of the older explanations withstand a test by these criteria.

Doyne held the streaks to be the result of fissures in the pigment epithelium, following, in his case, traumatic choroidal hemorrhages. According to Plange, Knapp[6], de Schweinitz[8], and Lindner[9], the streaks were the result of secondary changes after hemorrhages. To some extent Treacher Collins[10] also supports this view, when he says that "the deposition of haematogenous pigment (haematoidin and haemosiderin) derived from subchoroidal hemorrhages in the perivascular spaces of the short ciliary arteries, composing the circle of Zinn and the branches proceeding from it, best explains the appearance of the so-called angioid streaks." Oeller[11] and Calhoun[12] held similar views.

This theory of the hemorrhagic origin of angioid streaks was based on the fact that nearly all authors reported on hemorrhages occurring at some stage of the disease. In my first case, however, although very well-marked streaks were present in the one eye, over the greater part of the fundus, no definite signs of past or present hemorrhage in the retina or choroid were found. Griscom also pointed to this fact in his case, and Coppez and Danis, in their cases, reported the first hemorrhage nine years after the patient had come under their observation, the retina having been found normal previously. It seems clear that the theory of a hemorrhagic origin is based on a confusion of cause and result. The hemorrhages do not cause the streaks to appear, but the streaks may be the cause of hemorrhages.

It is quite impossible to understand how hemorrhages in the retina or choroid could lead to the appearance of structures which resemble blood vessels in color and form; in short, in nearly all characteristics. If hemorrhages were the cause of the white bands of choroiditis lining some of the streaks, as well as of the streaks themselves, why then do we not find these white lines along most of the streaks and especially along all the larger ones? Neither does this theory explain the familial occurrence of the disease, for which reason Treacher Collins had to go further and accept some constitu-

tional factor. But here again the question may be asked why hemorrhages, retinal or choroidal, lead to the appearance of angioid streaks only in persons affected by this constitutional factor, and why the fundus should react in such a curious and exceptional way in these cases?

A second group of authors (Wildi[13], Hughes[4], Asscher[14], Lohmann[15], Groenblad[16], Marchesani[17], Hartung[18], Poos[19]) all support Kofler[20], who first considered the angioid streaks as fissures in the lamina vitrea. Such cracks in the lamina would cause disturbances in both the choriocapillaris (hemorrhages) as well as in the pigment epithelium.

Recently a number of the supporters of this theory found further proof for their views in the fact that quite a few patients showing angioid streaks have been noticed to suffer from pseudoxanthoma elasticum, a peculiar skin disease, consisting in a degenerative breaking up of the elastic elements of the cutis (elastoclasis, elastorrhexis, Darier[21]). Unfortunately I could not get my two cases examined by a skin specialist up to the present, and although I personally looked very carefully for any signs of pseudoxanthoma elasticum and did not find any, it seems clear that the co-existence of this skin affection with angioid streaks is not a mere coincidence, and one might assume that degenerative changes of the elastic tissues, such as are found in the skin, may also play some part in the etiology of angioid streaks.

This being admitted, it is still not clear how fissures in the membrana elastica could lead to the appearance of angioid streaks. In order to be visible ophthalmoscopically, any fissure of the elastic membrane would have to extend through the membrana basalis and the pigment epithelium. But in view of the weak adherence between the elastic and basal membranes, it is unlikely that fissures, especially when they appear in a degenerated elastic membrane, would involve the basal membrane and pigment epithelium. Even if we suppose that they did, it would be difficult to understand why these fissures should take on such regular shapes, as, for instance, in figure 2. A rent in a structure such as the elastic membrane would be expected to have a ragged zigzagging appearance with irregular serrated borders. On the contrary the large vessel-like streaks in case 1 have a fairly straight course, and regular even margins. True, some of the streaks show serrated edges and become thicker here and there. In my cases this was observed only on the pigmented streaks, and could be easily explained as a result of unequal pigmentation. The large vessel-like streaks above the papilla in figure 3, where some dots of pigment are already lining their borders, would most likely have shown these serrated edges, had they been totally covered with pigment.

The theory based on fissures in the lamina elastics could therefore hardly account for the regular shape of the large vessel-like streaks. In fact it seems difficult to understand how fissures could occur in a degenerated membrane that has lost its elasticity and tension, unless one suggested that the degeneration of the elastic membrane progressed in lines. And if such fissures should occur in an elastic membrane that still retains some elasticity and tension, then we should find a widening of the streaks at each spot where they anastomose or cross each other; the elastic membrane would retract more in the angle formed by two anastomosing fissures.

There is, however, another objection to this theory. Hemorrhages, according to it, would occur frequently, because together with the lamina elastica, vessels of the choriocapillaris may be torn at the moment the fissures are formed. In the first instance it does not seem probable that cracks in a degenerated membrane would so easily tear the choroidal vessels unless these are assumed to be diseased too. And, secondly, one would expect to find the signs of past hemorrhages along most of the streaks and more especially along the large ones. They are, however, missing in most cases. The hemorrhages, moreover, would according to this theory occur in the choroid and would

therefore present a much duller red appearance than the hemorrhages, for instance, in case 1 (fig. 1), which were decidedly not in the choroid.

According to most authors (Coppez and Danis[3], Wildi[13], Bayer[22], Guist[23], Hartung[18]) who have tried to localize the streaks with the Gullstrand binocular ophthalmoscope, they lie in the deeper strata of the retina, approximately on a level with the pigment epithelium.

Fissures of the elastic membrane, as already pointed out, must therefore correspond with fissures of the pigment epithelium, and resulting hemorrhages should therefore frequently leave evidence of a disturbed retina along the paths of the streaks. On the contrary, as shown in figure 2, fundus changes, in the form of patches of choroiditis, were more often found in the areas beyond the peripheral endings of the streaks, than lining them. And when they did line them, they appeared as white bands of choroiditis. How do the supporters of the theory of fissures propose to explain these patches of choroiditis in the periphery? It is also not quite clear what explanation they advance to account for the macular affection, especially when the latter is caused not by a hemorrhage, but by an exudate; neither do they explain why the macular affection appears, as a rule, fairly late in the course of the disease.

Another group of authors (H. Pagenstecher[24], Zentmeyer[25], Bayer[22], Leber[26], Guist[23], Lederer[27], Coppez and Danis[3]) hold more or less the view that the angioid streaks are newly formed vessels due to an inflammatory condition, or pre-existing vessels which only become visible on account of a slow inflammation.

Coppez and Danis originally spoke of abnormal vessels, but when, years later, these "abnormal vessels" had become pigmented, and were found to be identical with the so-called angioid streaks, they slightly changed their view and compared the streaks with the appearance of pericorneal vessels during an inflammation.

The great objection to the theory of this group of authors is that in most cases the angioid streaks seem to be the cause of the inflammation rather than to be caused by such inflammation. Quite a number of cases are on record where angioid streaks existed for years without any definite signs of inflammation. Further objections to this theory are that the disease is always bilateral, has a familial occurrence, and seems to be hereditary. These are features that are not explained by the assumption that an inflammatory process (Axenfeld[28], Walser[29], Bayer[22]) or new-formed vessels resulting from a chronic inflammation are the cause of the angioid streaks.

Schrader[30] and originally Coppez and Danis thought that the streaks were abnormal vessels. Schrader believed them to be due to a kind of ectopia of the circle of Zinn, the latter lying in the retina instead of in the choroid. Treacher Collins also based his theory on the circle of Zinn, holding that these vessels became visible on account of the deposition of hematogenous pigment in their perivascular spaces. Fleischer[31] held that unknown pigment-filled lymphatic ducts were the cause of the streaks. Pretori[32] and Bachsinjan-Frenkel[5], as cited by Poos, believed that congenital anomalies of development are the underlying cause of the angioid streaks.

The view which I wish to advance here resembles nearest that of Schrader. The assumption that an anomaly of development, resulting in an ectopia of blood vessels, is the cause of the angioid streaks, seems to me best to explain all the different peculiarities of the disease.

By using the word "ectopia" I do not wish to say that a known system of vessels is displaced. What I have in mind is rather that, congenitally, abnormal vessels appear in an area where usually no such vessels are found. These vessels, I suggest, find their way between the two blades (the pigment epithelium and the retina proper) of the secondary eyecup, where they anastomose, branch, and spread.

How could these abnormal vessels appear in so wrong a place? We know that during a certain stage of the em-

bryological development of the eyecup, the hyaloid artery has three anastomoses with the primitive choroidal vascular system that covers the eyecup on the outside. The first is with the distal vascular ring, the second more proximal, and the third at the eye-stem (the future optic nerve). When the eyecup fissure closes these anastomoses evidently become obliterated together with the whole hyaloid vascular system, and the elastic membrane then finally forms a barrier between the choroidal vascular system and that on the inside (the retinal vascular system). If this barrier is deficient, it seems possible that vascular anomalies may result. This brings us back to the relation which appears to exist between angioid streaks of the retina and the skin affection known as pseudoxanthoma elasticum. Before Groenblad[16], Marchesani[17], Poos[19], and Hartung[18] had put this question on a definite footing, other authors (Lederer[27], Griscom[33], Batten[34], Verhoeff[35]) had already reported on the occurrence of disturbances of the skin and bones in patients suffering from angioid streaks.

Most important in this respect is the fact that pseudoxanthoma elasticum has a familial occurrence, seems to be hereditary and may appear at a very early age. Kissmeyer and With[36] found two sisters and a brother suffering from this disease. The sisters first noticed the skin affection at the ages of 10 and 18 years respectively, and the brother at about the age of 10.

Throne and Goodman[38] observed the disease in two sisters, in both of whom it had begun at the age of 4 years.

The earliest age at which angioid streaks have been recorded, was in a girl of 9 years (Bachsinjan-Frenkel[3]).

It is safe to assume that the degenerative condition of the elastic tissues, on which both the skin and the eye affection seem to be based, is a congenital and probably hereditary affair. Should the elastic membrane that forms the barrier between choroid and retina not function properly, due to a congenital degenerative condition, one could visualize a stage in the embryological eye (just after the eyecup fissure has closed) when the above-mentioned anastomoses of the hyaloid artery would traverse the retina, pigment epithelium, and lamina vitrea to join the choroidal vessels. The possibility that, emanating from these anastomoses, branches may spread between the two, still loosely connected blades of the embryologic eye, seems to be thereby given. One might even be tempted to go further and suggest, that, given a weak or degenerated elastic membrane, vessels from the choroidal system might find their way free to traverse the pigment epithelium and land between the latter and the inner blade of the embryologic eye. Such vessels, not being adapted to their environment, lying, as they do, in a tissue not calculated to carry vessels, might be regarded as constituting a labile system. They would be easily vulnerable and disposed to adverse reactions to any infectious material carried through them.

These vessels need not necessarily always be visible ophthalmoscopically. Much would depend on their size and whether any reactions have taken place in their walls or in the pigment epithelium on which they lie. The latter would gradually, perhaps as a result of a slow peri-arteritis or periphlebitis, or perhaps even because these vessels act here as foreign bodies, cover them with pigment.

Where this perivascular inflammation appears in a slightly more pronounced degree, the choroid would also be involved, leading to the white bands of choroiditis lining some of the streaks. Further, any infectious material carried through these vessels, might land in the smaller branches in the periphery and there cause the patches of choroiditis, with which the streaks frequently seem to connect (fig. 2).

Hemorrhages, whether due to trauma or other reasons, and transudates and inflammatory exudates would naturally be expected to appear at a more advanced age, when these abnormal vessels, in common with the general vascular system, have become sclerosed, and therefore less resistant.

This conception would also explain

the usually late appearance of the macular affection due either to a hemorrhage, a transudate, or an exudate.

The hemorrhages would lie mostly in the deep layers of the retina and not, as a rule, in the choroid.

The assumption, therefore, that, due to an anomaly of development, abnormal vessels find their way between the two blades of the embryological eye, fully explains, to my mind, every feature and peculiarity of the disease known as angioid streaks.

12 Gresham Building.

References

[1] Doyne. Trans. Ophth. Soc. U. Kingdom, 1889, v. 9, p. 128.
[2] Plange, O. Arch. f. Augenh., 1891, v. 23. Arch. of Ophth., 1892, v. 21, p. 282.
[3] Coppez, H. and Danis, M. Arch. d'Opht., 1925, v. 42, p. 649.
[4] Hughes, W. L. Arch. of Ophth., 1929, v. 1, p. 551.
[5] Bachsinjan-Frenkel. Arch. f. Ophth., 1927, v. 3 (Russian).
[6] Knapp. Arch. of Ophth., 1892, v. 21, p. 289.
[7] Holden, H. Arch. f. Augenh., 1895, v. 31. Arch. of Ophth., 1895, v. 24, p. 147.
[8] de Schweinitz, G. E. Trans. Amer. Ophth. Soc., 1896, v. 33, p. 650.
[9] Lindner, K. Arch. f. Ophth., 1914, v. 88, p. 230.
[10] Treacher Collins, E. Trans. Ophth. Soc. U. Kingdom, 1923, v. 43, p. 273.
[11] Oeller, H. Atlas seltener ophth. Befunde. Pt. 2, 1903.
[12] Calhoun, P. Amer. Jour. Ophth., 1928, v. 11, p. 91.
[13] Wildi, G. Klin. Monatsbl. f. Augenh., 1926, v. 76, p. 117.
[14] Asscher, K. W. Klin. Monatsbl. f. Augenh., 1921, v. 67, p. 616.
[15] Lohmann. Arch. f. Augenh., 1922, v. 90.
[16] Groenblad. Acta Ophth., 1929, v. 7, p. 1.
[17] Marchesani. Arch. f. Augenh., 1931, v. 104, p. 522.
[18] Hartung, H. Klin. Monatsbl. f. Augenh., 1932, v. 88, p. 43.
[19] Poos, F. Klin. Monatsbl. f. Augenh., 1931, v. 87, p. 734.
[20] Kofler, A. Arch. f. Augenh., 1917, v. 82, p. 134.
[21] Darier, J. Monatsh. f. prakt. Dermat., 1896, v. 23, p. 609.
[22] Bayer, H. Klin. Monatsbl. f. Augenh., 1913, v. 51, p. 766.
[23] Guist. Ztschr. f. Augenh., 1921, v. 45.
[24] Pagenstecher, H. Arch. f. Ophth., 1908, v. 67, p. 298.
[25] Zentmeyer, W. Trans. Amer. Ophth. Soc., 1909, v. 12, p. 266.
[26] Leber. Graefe-Saemisch Handbuch. 1915, v. 7, II, chap. 10.
[27] Lederer. Klin. Monatsbl. f. Augenh., 1923, v. 71, p. 767.
[28] Axenfeld, T. Arch. f. Ophth., 1915, v. 90, p. 452.
[29] Walser, B. Arch. f. Augenh., 1895, v. 31, p. 345.
[30] Schrader. Ztschr. f. Augenh., 1906, v. 16, p. 81.
[31] Fleischer, B. Klin. Monatsbl. f. Augenh., 1914, v. 53, p. 430.
[32] Pretori, H. Beitr. z. Augenh., 1898, v. 3, p. 198.
[33] Griscom, J. M. Amer. Jour. Ophth., 1928, v. 11, p. 95.
[34] Batten, D. R. Brit. Jour. Ophth., 1931, v. 15, p. 5.
[35] Verhoeff, F. H. Presession Book of the Sect. of Ophth., Amer. Med. Assoc., 1928.
[36] Kissmeyer and With. Brit. Jour. Dermat. and Syph., 1922, v. 34.
[37] Thorne and Goodman. Arch. Dermat. and Syph., 1921, v. 4.

THE HISTORY OF CATARACT OPERATIONS

EDWARD JACKSON, M.D.
DENVER, COLORADO

The history of the operation for couching and its development into cataract extraction is here traced, with the evidence of the superior efficiency of the modern operation. Read before the Section of Medical History, Denver, November 18, 1932.

"Medicine and surgery are as old as human needs." The removal of cataract to restore sight is, perhaps, the oldest operation known to history. Cranial trephining and circumcision may have equal claims to antiquity, but of none other than the cataract operation is so much recorded that links us with the prehistoric past. The operation for cataract was practiced in India three thousand years ago, and has continually been performed there, down to the present time, in very nearly its original form, and even now in competition with the latest modifications introduced by scientific surgery. In all the older history, the form of the operation was that of displacement of the cataract within the eyeball, so that it would be removed from the line of sight. Since the middle of the eighteenth century, the preferred method has been to take the cataract out of the eyeball.

It has been common to think of these two as different operations. But the account of his own experience, given by Daviel, shows very clearly that cataract extraction was a direct modification of couching, or reclination of cataract. It was a modification scarcely greater than that made by Graefe, with his narrow knife and linear incision, or than those practiced by Henry Smith in expression, or by Barraquer in extraction with the erisiphake. The chief difference is that the improvement made by Daviel has been generally accepted, and made the basis of the further changes tried by the ophthalmic surgeons that have followed him.

For more than one hundred years English surgeons, trained in the Moorfields Eye Hospital, of London, in cataract extraction after the method of Daviel and his followers, have been brought in close contact with the old Indian method of couching, still practiced in some parts of India. Modern surgery has been able to form an estimate, and write the history of an operation, practiced before bronze and copper had given place to steel, as the material for surgical instruments. It is probable that couching, or displacement of the crystalline lens, was first practiced in India, and is still done there in close imitation of the primitive procedure.

Colonel Elliot[1] points out: "Those who have spent their lives in an Eastern land know the unbending force of tradition, the hereditary character of occupations, and the intense conservatism of Oriental peoples. All these influences are against change of any kind, and greatly retard the spread of new ideas. When we consider an operation like couching, which is well known over the whole of the East, and which meets in the simplest manner an age-long need, felt in every village of a tropical or subtropical country, it is not difficult to believe that the procedure may have been one of the early fruits of advancing civilization, far away back in Babylon the Great, or even earlier still in the home of the Pyramids, tens of centuries before the dawn of the Christian Era."

But the first account of the cataract operation in history comes to us from Celsus, who, at the beginning of the Christian Era, credits the operation to Philoxenes, who practiced in Alexandria in 270 B.C. The patient sat facing the light, an assistant behind him keeping the head immovable, the other eye being kept fixed by wool tied over it. "The operation must be performed on the left eye by the right hand, and on the right eye by the left hand. Then the needle, sharp-pointed, but by no means too slender, is to be applied and must be thrust in a straight direction, through the two coats, in the middle part betwixt the black of the eye and

the external angle opposite to the middle of the cataract. . . . The needle must be turned upon the cataract and gently moved up and down there, and by degrees, work the cataract downward below the pupil; when it has passed the pupil it must be pressed down with a considerable force, that it may settle in the inferior part."

Two hundred years after Celsus, Galen stated that both in Alexandria and in Rome, there were surgeons who confined their practice to operating on cataract. The modern surgical clinic has not surpassed this in specialization. Avicenna, describing the operation as practiced by the Arabs in the tenth century, states that they used a sharp lancet to penetrate the cornea and through this opening introduced the needle to depress the cataract.

Benevenutus Grassus[2] wrote "De Oculis" probably in the twelfth century. It had a wide circulation in manuscript, and was published in 1574; probably "the earliest printed book on the eye" (Garrison). From the translation by Casey A. Wood, it appears that "Some ignorant physicians attempt to remove the cataract by purgation, powders and collyriums. They fail because the disease cannot be controlled by such remedies." The operation which Benevenutus Grassus recommends as "the most approved and tried practice of our art" is: "With one hand raise the upper lid, and with the other hold a silver needle and direct it toward the outer lacrimal region. Then perforate the eye coats, pushing, turning the instrument around with the fingers until you touch the diseased matter, which the Saracens and Arabs call linzaret (but which we call cataract), with the point of the needle; and dislodge it from its position in front of the pupil. Then push it well below, holding it there until you have said four *pater nosters.* Then carefully and slowly turn the needle back to it first position in front of the eye. If the cataract follows the instrument and shows itself in front, you must again depress it, pushing it this time as much as possible toward the ear. Then withdraw the needle in the same manner that it was inserted. And note well, that having entered the instrument, you must not withdraw it, until you are convinced that you have depressed the cataract in the manner just described.

"After the operation the patient's eye must be closed, and he should be kept in bed on his back in a shady part of the house. He must not be moved nor allowed to look at a light for eight days, during which period the eye operated on must be dressed with white of egg, twice a day, and twice during the night. His diet should be soft, fresh eggs with bread. If the patient is young let him drink water; if old, he may drink a little wine, well diluted with water."

This author recognizes four kinds of curable and three of incurable cataract. Of the latter he says: "If these people with *gutta serena* had all the money in the world and were willing to part with it, and every man were a physician, it would avail them nothing toward a restoration of sight." A passage which the enthusiastic operator might still bear in mind.

The operation for displacement of cataract was widely practiced in Europe. It was described in Spain by El Kasim, "whose name proclaims his Arab parentage" (Elliot). Bartisch "the father of German ophthalmology" published his book, "Augendienst," in 1584, in which are given two pictures to show the method of performing the operation; and it was widely done in Europe until within the last century. In 1836 S. Littell[3], of Philadelphia, wrote in his "Manual of Diseases of the Eye," after describing the operation of division or solution: "In this country the operation by solution is generally preferred," and then describing the operations of depression and extraction, balanced their relative advantages thus: "Though the advantages of extraction have been vividly portrayed by its friends, there are reasons which will ever prevent it from being practiced by the great body of the profession. It is both complicated and difficult; requiring more than an ordinary degree of resolution and steadiness on the part of the patient, and greater experience and manual dexterity than can be expected from

the generality of surgeons who have few opportunities of witnessing, or performing, such operations."

Later he quotes statistics to support his views: "A comparison of the results furnished by the different modes of operating for cataract, leaves no doubt as to their relative value. In three hundred and six cases of cataract at La Charité, the cures were in the proportion of two and one-half to one; while of an equal number depressed by Dupuytren at the Hotel Dieu, they were more than five to one. Of seventy operations by extraction, forty-three by displacement, and twenty-one by keratonyxis, performed at the institution last mentioned, between the years 1806-1810, the successful cases were respectively nineteen, twenty-four, and seventeen. The native Hindoos practice a rude method of depression, through a puncture previously made with a lancet and, of seventy-seven operations thus performed, the cures were as two and one-half to one."

Littell's book was also printed in London in 1838. The book of Wharton Jones[4], of London, on "Ophthalmic Medicine and Surgery," and the "Maladies des Yeux" of Prof. Desmarres[5], of Paris, both published in 1847, give very similar estimates of the different cataract operations then competing for the favor of the ophthalmologists.

The practical efficiency and danger of the depression of cataract as compared with the extraction operations of our own time, has been brought out by statistical studies made by the ophthalmologists of the Indian Medical Service, who still have the opportunity of seeing many cases that have been treated by the depression operations of native Hindu and Mohammedan operators. Colonel Elliot, in his Hunterian lectures, 1917, gave the statistics of 780 patients seen by himself and his successor Major Kirkpatrick, during their services as superintendents of the Government Ophthalmic Hospital at Madras. Of these 10.59 percent had vision of 1/3 or better; in 11.05 percent vision ranged from 1/4 to 1/10; in 9.64 percent it was 1/10 to 1/50; and in 7.05 percent it was counting fingers at 2 feet, or less. If every case in which vision was 1/10 were counted a success, couching had 21.64 percent of successes, and, counting all in which vision was less than this, 16.69 percent of partial successes. This left failures of 62 percent.

Of the cases operated on at the Madras Hospital by extraction good results were obtained in 96 percent, partial success in 2 percent, and failures in 2 percent. The increase of success, or partial success, from 38 percent to 96 percent, and the decrease of failures from 62 percent to 2 percent, indicates the advance of modern surgery, the superiority of cataract extraction over couching. But this gain was not made by simply inventing a new operation.

Georg Bartisch[6] lived until 1607. He became the court oculist of Saxony. He styled himself "oculist," and "cutting and surgical doctor." He operated in various places, but was not one of the itinerant, charlatan oculists, like "Chevalier Taylor," of England. Bartisch devised the operation for the enucleation of the whole eye, and illustrated his first case, an eye protruding from a tumor. He did the couching operation, not essentially different from that still done in India, as illustrated by Elliot. But, during the life of Bartisch, Vesalius, Fallopius and Fabricius had studied and taught anatomy in France and Italy. They weakened the superstitious reverence for Galen that dominated European medicine through the Middle Ages.

The year before Bartisch died, Brisseau pointed out that Galen was wrong in his representation of the crystalline lens at the center of the eyeball; and that cataract was not an effusion, poured out in front of the lens, but the lens itself becoming partly or quite opaque. In 1617 Maitre Jan reported that in 1592 he had examined, post mortem, an eye with a cataract; and that the cataract was an opaque lens. Years before Lasnier had called attention to this. Thus confirmed, this teaching spread and was accepted in Western Europe. The old belief that cataract was a morbid secretion that had poured down in front of the lens and coagulated was confuted and given up. It began to be

understood that what had been pushed back and down, in couching, was really the crystalline lens.

Jacques Daviel[7], the "inventor of cataract extraction," was born in Normandy in 1696. He was an assistant surgeon in the army, when in 1719 he volunteered to serve against the plague, the epidemic in which 50,000, more than half the population, died in Marseilles. For this service he was promoted from assistant to Surgeon Major. In 1728 he began to devote himself exclusively to diseases of the eye. In 1745 a patient, Brother Felix, had both eyes operated on by couching and lost both. Daviel "made new experiments on cadavers, and then performed one after another, seven depressions with complete success."

On April 8, 1747, failing to depress a cataract he did what had been done before when the cataract was dislocated into the anterior chamber. He enlarged the opening in the cornea, "then with a small pincette, held the cornea well up and passed through the pupil my small spatula, with which I extracted from the posterior chamber the entire lens; which had divided and then become broken into pieces by the first operation, which I had made already on this eye. The extraction was followed by the exit of a part of the vitreous, which, in fact, had also been divided by the earlier operation. But in spite of this disturbance, the patient distinguished objects very well after the operation, and was well a short time afterward. After this time and during the three following years I performed this operation several times upon the living, in order to get accustomed to it gradually." After three years he "came to a firm decision in the future to operate for cataract only by the extraction of the lens."

His method of operating by extraction carried important reminders of his method of couching. The instruments he used were: (1) A broad needle for the first opening. (2) A needle blunt at the point but cutting on the sides, to enlarge the opening. (3) Double curved scissors, to make the opening of full size. (4) A small spatula to lift the cornea. (5) A small sharp needle for opening the capsule of the lens. (6) A small spoon to facilitate its exit. (7) A small forceps to remove bits of membrane. The position of surgeon and patient, and manner of controlling the head of the latter, were quite similar to those used by Bartisch, and probably by Daviel himself, for couching. He stated that up to November 15, 1752, he had done 206 of these operations, of which 182 were successful.

Samuel Sharp[8], of London, a noted surgeon born about 1700 was a pupil of William Cheselden. He visited Paris in 1749, and at that time may have heard of Daviel's extraction operation. Daviel still enlarged the opening into the cornea with his special needle and scissors. Sharp invented a cataract knife and opened the cornea with one free incision. On April 12, 1753, he read before the Royal Society a paper entitled "A Description of a New Method of Opening the Cornea in Order to Extract the Crystalline." A second paper on the subject he read on November 22, 1753. These papers, says Hubbell, "in the extraction of cataract and in the history of the operation of extraction of cataract, have an importance second only to the immortal invention of Daviel, the originator of the modern operation."

Sharp opened the cornea with a narrow, sharp-pointed knife curved like a bistoury, with which he transfixed the cornea and cut downward. His whole operation bore as close a resemblance to the modern cataract operation as did Daviel's to the older operation of couching. Hubbell[9] says: "In the capacity of originator he stands but little below the immortal Daviel himself. With an insight, genius, and skill seldom if ever surpassed, he took Daviel's gift and without other guide or compass, brought the operation of extraction, even in the face of inherent obstacles and difficulties, to a perfection which challenges the most profound admiration. He used the single knife, the form of which is such as might be successfully used today, his corneal incision was in accordance with the best notions of the most skillful operators of the present time. . . . He did not excise a

portion of the iris, and he endeavored to remove the lens in its capsule, a desideratum still sought by many. He foresaw the needs of the operation, and hinted at improvements which have since been adopted. He was mistaken in a few things, but for the most part he was right."

Of Sharp, Sir James Paget[10] said, in his Hunterian Oration (1877): "He was a thoroughly informed surgeon, well read, observant, judicious, a lover of simplicity, wisely doubtful. I think, too, he must have been an eminently safe man who might be relied on for knowledge, or doing whatever, in his time, could be done for the good of his patients. In this view, I believe he was as good a surgeon as Hunter."

Since his time the principal modifications of the operation have been of the form of the knife and the placing of the corneal incision. Professor Beer, of Vienna, in 1799, suggested a form of flat knife having a straight cutting edge and back, meeting each other at an angle of not more than 18 degrees, with the handle in the direction of the straight back. This was used for making a puncture and counter-puncture, with the point (that was sharpened on both sides) and thrusting the knife steadily forward in the direction of the back, until the incision was completed, in the upper half of the cornea. This "Beer's knife" has proved itself a good surgical knife for various purposes. Beer used it for his operation of abscission—amputation of the anterior segment of the eye.

In 1865 Albrecht von Graefe came to understand that the shortest distance between two points on the surface of a sphere, is found in the great circle; that is, a circle lying in a plane passing through the center of curvature. To make such an incision in the cornea he devised a narrow knife, with parallel cutting edge and back, and called his operation a linear extraction of cataract. Two years' practice with it showed some defects, and he changed slightly his point of puncture, and his "modified linear extraction" became the standard cataract extraction for the great mass of surgeons. The knife was found well adapted to other purposes, such as iridectomy for glaucoma and division of membranes in the eyeball. Each operator has special preferences; so Graefe knives vary in breadth from 1.5 to 4 mm., and in length and thickness. The broader knives give some of the chief advantages of the Beer knife. The Graefe knife is found in the armamentarium of every ophthalmologist, and the Graefe operation has been the basis of innumerable operations for extraction of cataract that still occupy the attention of ophthalmic surgeons.

The Beer and Graefe knives are still widely used, but many modifications known by the names of the operators who have suggested them have been tried since Sharp proposed the first distinctive cataract knife. In Wood's "System of Ophthalmic Operations"[11], thirty-seven different forms of cataract knife were figured. The placing of the corneal incision has widely varied. Starting in the lower half of the cornea, as Daviel and Sharp did, the upper section soon came to be the more popular. There the scar was hidden by the lid; if not smooth, it interfered less with vision; the value of the lid cartilage acting as splint was recognized; the prevention of wound infection by the covering and the flow of tears came to be known as important.

The incision was first placed wholly in the clear cornea, sometimes only a little above the center. But the tendency has been to shift it toward the limbus, or entirely outside the clear cornea. This gave a longer, freer opening, brought it nearer to the nutritive vessels, from which reparative material had to be drawn, and finally in the conjunctival flap, utilized the best possible protective tissue for prompt closure of the wound and to prevent displacement of its margins. The removal of the scar from the visual center of the pupil also decreased the amount of impairment of vision by operative astigmatism of the cornea.

We have not now, and probably never can have, any direct information regarding the original cataract operation, or the instrument with which it was done. But some of the Indian

couchers still use for the anterior operation, according to Elliot, "the long needle-like thorn of the balbul-tree, which is thrust suddenly through the cornea, and on through the pupil or iris, into, or onto the periphery of the lens." It is possible that the accidental injury by such a thorn, followed by the escape of gray lens matter, looking like cataract as seen in the pupil, may have originally suggested the cataract operation. The long continuance of the operation for depression of cataract must have depended on the relatively slight pain, caused by a perforating wound in an uninflamed cornea.

An operation closely associated with that for cataract extraction is the operation for artificial pupil. This was described in 1728 by Cheselden; namely, a slit made in the iris, opened by retraction of the iris fibres—an iridotomy. It was modified by Beer, about 1798. He did an iridectomy by seizing the iris with forceps, drawing it out of the eye and snipping it off with scissors. Artificial pupil was generally needed when the cataract operation had been followed by an opaque membrane, or the closure and fixation of the pupil by contraction of an inflammatory exudate. It was an operation for after-cataract, and came to be done with the cataract operation, to prevent such results. When Graefe's modified linear extraction became the operation of choice, the iridectomy was a most important part of it. Later, for eyes regarded as favorable, iridectomy was omitted, especially by Herman Knapp, and now the frequency with which it is done in cataract extraction depends on the experience and preference of the operator. Peripheral may replace complete iridectomy in a large share of cases.

Sharp suggested the removal of the lens in its capsule. This has occasionally been done since the cataract operation became an extraction. Of late years several different operators sought to make this the rule instead of the exception. The various methods of Pagenstecher, Henry Smith, Barraquer, Arnold Knapp, and others are still before the profession for improvement or rejection. It is still uncertain when and how far the greater disturbance of the eye, incident to removing the capsule, will be compensated by better results with the capsule removed. Improvement of the cataract operation is still going on, and every ingenious modification by an individual operator must be carefully weighed in the balance of general professional experience.

References

[1] Elliot. Couching for cataract. Hunterian Lectures, 1917.
[2] Benevenutus Grassus. De Oculis. Trans. by Casey A. Wood, 1929.
[3] Littell. Manual of diseases of the Eye, 1836.
[4] Wharton Jones. Ophthalmic medicine and surgery. Amer. Ed., edited by Isaac Hays, 1847.
[5] Desmarres. Maladies des Yeux, 1847.
[6] Bartisch. Augendienst, 1583.
[7] Daviel. American encyclopedia of ophthalmology. v. 5, p. 3751.
[8] Sharp. Philos. Transactions, 1753, p. 161.
[9] Hubbell. Trans. Amer. Acad. Ophth. and Oto-Laryng., 1904, p. 51.
[10] Paget. Hunterian oration, 1877.
[11] Wood. A system of ophthalmic operations. v. 2, p. 1146.

EXPERIMENTAL TUBERCULOSIS OF THE EYE

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An injection of a dilute suspension of virulent tubercle bacilli into the ciliary body of fifteen rabbits' eyes induced a localized form of tuberculosis, which in a large proportion of the animals could be confined to the pars plana at the onset, and which in nine cases migrated posteriorly into the vitreous, into the choroid, and more rarely into the retina; less frequently the migration was anteriorly. Microscopic section of the vitreous exudate was characteristic of tuberculosis. The material for this paper was taken from the thesis submitted to the Graduate School of the University of Colorado, June, 1932, for the Doctor of Ophthalmology degree. From the Department of Ophthalmology, University of Colorado School of Medicine, Denver.

Tuberculosis has been recognized as a cause of certain forms of uveitis for more than a hundred years. In 1711 Maitre Jan[1] reported a case of a man with a growth on the iris which extended through the cornea, and the eye eventually atrophied.

Jaeger[2], in 1813, examined the ciliary body of an eye in which a tubercle was found. The tubercle finally invaded the cornea which later led to the loss of the eye.

Before Koch's[3] time a rather hazy conception of tuberculosis based on clinical facts was current. With his discovery of the microorganism, in 1882, a better foundation was laid for the study of tuberculosis.

Friedrich and Nosske[4], in 1899, reported their work, in which they injected tubercle bacilli into the eyes of animals and produced tuberculosis.

It was not until 1903 that Stock[5] demonstrated experimentally that chronic uveitis was often due to tuberculosis. He injected tubercle bacilli into the auricular veins of rabbits. In a large percent of the animals observed clinically, typical tuberculous lesions were found.

Following Stock's observations, other research workers became interested and produced lesions in animals similar to those obtained by him. Arnold Lawson[6] at a much later date contended that iridocyclitis was a most common form of tuberculous uveitis.

Verhoeff[7], in 1910, with microscopic studies, showed that the ciliary processes were involved and demonstrated a rupture of the tips, with extension to other parts of the eye, by way of the posterior chamber, pupil, anterior chamber, and through the ligamentum pectinatum to the episcleral tissue. He stressed the anterior migration of the tuberculous process from the ciliary body and claimed that the primary ocular location of cases of episcleritis was in the ciliary body. However, he did not emphasize the fact that migration posteriorly was of equal importance.

In 1911, Fleischer[8] reported a case of tuberculous periphlebitis in which microscopic examination showed a tubercle in the ciliary body with involvement of the retinal vessels. He concluded from a study of his specimens that the primary focus of ocular tuberculosis was often in the ciliary body and that the retinal vessels were invaded secondarily from this point. It was his belief that organisms entered the uveal circulation, lodged in the ciliary body, producing a tubercle, and set up a mild tuberculous cyclitis that was often unrecognized, but, as the tuberculous infection advanced, it extended backwards, and migrated into the retinal vessels, producing definite clinical symptoms that could be recognized.

From a perusal of the literature one must conclude that all portions of the eye can be involved in a tuberculous process. The eye is rarely the primary site of the disease, but its involvement is usually secondary to some focus that is located elsewhere in the body.

There has been much speculation regarding the method in which tuberculosis spreads in the eye after an ocular focus is established. The experiments of Stock[5], Lagrange[9], Otori[10], Finnoff[11], and others proved definitely that the tubercle bacilli in the blood stream may accidentally lodge in the eye and produce ocular tuberculosis. When a primary focus is located in the ciliary body extension can

take place to other parts of the eye. Fleischer[6], Verhoeff[7], Finnoff[12], Von Szily[13], and others report specimens in which microscopic evidence of such an extension occurred in human eyes.

With the above facts in mind I carried out a series of experiments in animals to determine, if possible, whether a primary tuberculous focus in the ciliary body could extend to other portions of the eye, and if it did, how the extension occurred, and what portions of the eye were affected.

The first problem with which I was confronted was: (1) How to produce a localized tuberculous process in the ciliary body; (2) How to obtain a mild form of tuberculosis without rapid dissemination and panophthalmitis.

It was finally decided that the most feasible plan was to insert a sharp, 32-gauge, hypodermic needle through the sclera 2 mm. behind the limbus, and to inject .02 c.c. of a very diluted suspension of virulent tubercle bacilli into the ciliary body.

The eye was anesthetized with a sterile 2-percent butyn solution, and later the conjunctival sac was flushed with a 2-percent mercurochrome solution to render the eye as sterile as possible. The point of the needle was cautiously pushed through the sclera to avoid entering the vitreous chamber, so that the fluid would be confined to the ciliary body at the time of the injection. In a few instances it was thought that the needle passed beyond the ciliary body and these animals were discarded.

After injection the animals were examined the next day, to determine whether injury had been produced at the time of inoculation, and in no instance did I find evidence of trauma to the lens or vitreous, and for this reason I felt that the technic was satisfactory for my purpose. I considered making a small opening just through the sclera and introducing the suspension of tubercle bacilli into the perichoroidal space under the ciliary body, but rejected this method because of the possibility of secondary infection and undue trauma that might have added complicating features to the experiment.

In none of the eyes did a severe reaction or panophthalmitis occur, as is usually the case when a more concentrated suspension of tubercle bacilli is used. My suspension consisted of the smallest quantity that I could obtain by gently touching the end of a sterile wire loop to a fresh culture of tubercle bacilli, transferring it to a mortar, and thoroughly mixing with a drop of sterile salt solution. This was then gently macerated with a pestle, while 50 c.c. of sterile salt solution were slowly added. The solution was then drawn into a tuberculin syringe for injection into the eye. Every precaution to avoid contamination was observed.

In all, fifteen rabbit eyes were used, the right eye being injected in the horizontal meridian on the temporal side, 2 mm. behind the limbus as stated above. The eyes were examined at intervals of 24 hours with oblique illumination and Coddington lens, in addition to the ophthalmoscope. It was found impractical to use the corneal microscope because of the inability to keep the eye fixed in one position, even after placing the animal in a special box constructed for this purpose.

Animal I. Animal I was injected on August 19, 1931. The following day a faint haze had developed throughout the vitreous. On August 22d, this vitreous haze was less marked and finally disappeared altogether after two days. On August 28th, vitreous floaters were observed, which were of a different character. They were oval, brilliant white opacities in the deeper portion of the vitreous. The choroid showed no tubercles and the iris and anterior chamber remained free of any involvement. On August 29th an abscess formed on the lower jaw, which proved later not to be of tuberculous origin. On September 1st, the vitreous floaters were still present and had not changed their appearance. Two days later the pupil became much smaller. The aqueous remained clear and no tubercles were found in the choroid. On September 6th, the floaters became club shaped and larger. Slight edema of the optic nerve was noted at this time.

On September 7th, the animal was killed, the eye enucleated, fixed in Zenker's solution, embedded in celloidin, sectioned, and stained with hematoxylin and eosin. At autopsy there was no tu-

berculous involvement of the lungs, spleen, kidneys, or liver.

Microscopic Findings

The *cornea* was normal.

Anterior chamber: A small quantity of fibrin was found in the angle, but no inflammatory cells.

Iris: A posterior synechia, limited to the inner two thirds of the iris in the area corresponding to the sphincter, was found. The iris stroma was slightly infiltrated with a few lymphocytes and plasma cells.

Ciliary body: Numerous small round cells and plasma cells were scattered over the surface of the ciliary body. Moderate edema of the epithelium was noted. There was slight cellular infiltration of the stroma with round cells at the site of the injection.

Posterior chamber: The chamber was filled with fibrin, a few lymphocytes, and plasma cells in addition to fibroblasts that extended forward to the ciliary processes.

The *vitreous* showed a diffuse infiltration with fibrin, a few small round cells and plasma cells; in addition, several round and oval masses that were made up of a collection of epithelioid cells, small round cells, plasma cells, and fibroblasts. The epithelioid cells were located in the center of the vitreous mass and immediately surrounding it were plasma and small round cells. These in turn were surrounded by a layer of fibroblasts that varied in thickness. In some instances the fibroblasts were arranged in elongated strands that ran into the vitreous in various directions from the cellular mass as is shown by figure 1.

The exudation of small round and plasma cells was more conspicuous near the retina in front of the so-called hyaloid membrane than in the remainder of the vitreous. There were several small round clumps of epithelioid cells that represented early tubercles in the vitreous.* In some of the masses the center had undergone caseation. These masses varied from 1/10 to 1/2 mm. in diameter.

Retina: In several places under the collections of vitreous exudate, there was a slight infiltration of the inner layers of the retina with small round cells. Over the site of a choroidal tubercle, there was marked edema of the inner and outer nuclear layers and beginning disintegration of the retina. The inner surface of the retina was intact and

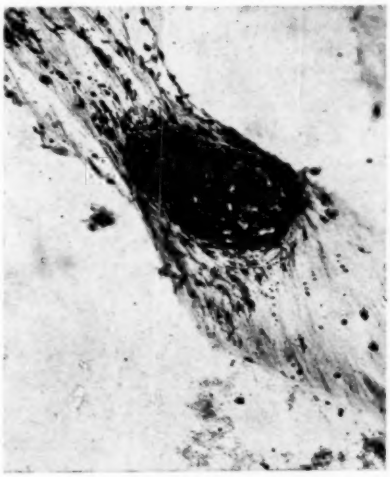

Fig. 1 (Ohmart). Vitreous tubercle surrounded by fibroblasts.

showed no cellular infiltration in the vitreous over this point. The choroid immediately under this portion showed a minute beginning tubercle consisting of a few epithelioid cells surrounded by lymphocytes. A well-advanced choroidal tubercle with epithelioid cells and lymphocytes was found on the nasal side. The surface of the retina over the tubercle was not invaded.

Choroid: There was a tubercle on the nasal side of injection, 6½ mm. behind the ora serrata, made up of epithelioid and small round cells as described under *Retina.* This had broken through the lamina vitrea and destroyed the outer and part of the inner nuclear layers of the retina. The nerve-fiber layer of the retina was edematous over this lesion but had not been destroyed. Smaller tubercles were found in the middle layers of the choroid with slight degeneration of the pigmented epithelium and beginning degeneration of the external nu-

* For convenience of description Dr. William C. Finnoff has suggested that I call these, vitreous tubercles, and this term is used throughout the thesis.

clear layer of the retina. The vitreous in the proximity of these early lesions showed only slight infiltration.

Optic Nerve: A distinct papillitis with edema was found. There was a deposit of lymphocytes on the surface of the disc.

Summary

Animal I was the type in which there was a diffuse tuberculous cyclitis at the site of injection with extension into the vitreous in the form of fibrin, epithelioid cells, lymphocytes, and plasma cells in addition to distinct tubercles in the vitreous, together with choroidal tubercles and optic neuritis. Involvement of the iris was slight, therefore there was no cellular infiltration into the aqueous. No deposits were found on the posterior surface of the cornea. The migration of the tubercles was predominantly posteriorward in this eye.

Fig. 2 (Ohmart). Gilbert-Koeppe nodule at the pupillary border of the iris.

Each animal was carried through, as given in detail for Animal I. The results of the other fourteen will be given in a brief summary, as follows:

The cornea remained normal in nine of the eyes, the other five showing deposits made up of lymphocytes and plasma cells on its posterior surface.

The anterior chamber contained fibrin but no inflammatory cells in seven of the eyes. The remaining seven were normal.

The iris was not involved in nine of the eyes. One showed destruction of the pigment-cell layer which was replaced by round cells and plasma cells. The other four showed invasion by way of the anterior-border layer. The iris stroma had become edematous and infiltrated with lymphocytes. One of these four showed a diffuse iritis. Gilbert-Koeppe nodules were found in four of the eyes, made up of plasma cells as is shown by figure 2.

The lens was found to be cataractous in two eyes, which was considered to be due to trauma at the time of the injection.

Fig. 3 (Ohmart). Tubercle in pars plana near site of injection.

The ciliary body remained normal in seven eyes. Four showed diffuse tuberculosis of the ciliary body, with formed or beginning cyclitic membrane extending into the vitreous, made up of fibrin, epithelioid cells, lymphocytes, and plasma cells. The other three showed tubercles in the pars plana, made up of epithelioid cells and plasma cells as is pictured in figure 3.

The posterior chamber contained a

cyclitic membrane undergoing organization in four of the eyes. Seven were normal. Three contained a fibrinous infiltrate, a few lymphocytes, and plasma cells.

Ten eyes showed involvement of the vitreous. The tubercles were made up of a collection of epithelioid cells, small round cells, plasma cells, and fibroblasts. Many of the tubercles were in the vitreous mass, while some seemed to rest lightly on the retina. Four, apparently, remained normal to the invasion of tubercles. One of these, however, showed a distinct fibrinous exudate.

Only one eye showed definite tubercles of the retina. The retina was normal in five eyes. The remaining eight showed involvement by the tubercle's being in the choroid and eventually breaking down the layers of the retina, or resting on the retina and breaking through the retina and involving the choroid. Many of these tubercles contained round cells and giant cells.

Two types of tubercles were found in the choroid of all of the eyes. One type was made up of a few isolated tubercles composed of caseated centers and giant cells, which usually involved some of the layers of the retina; the other type had entirely broken through into the vitreous producing a very diffuse tuberculosis of the entire choroid. In one eye a tubercle was found in the angle of the anterior chamber breaking through the limbus; surrounding this were episcleral nodules with extension into the perichoroidal space.

The optic disc remained free of involvement in seven eyes. One showed a small perivascular tubercle on the surface of the disc that had broken through the perivascular layer. Several sections showed a definite perivasculitis. At one place an extension along the vessels had taken place with a small tubercle just on the outer surface of the sclera. Another eye showed a circumscribed tubercle which involved the optic nerve and had invaded the sclera with scar formation. Four showed papilledema with round-cell infiltration. The other one showed a definite optic neuritis.

The predominating migration was anteriorly in three eyes, anteriorly and posteriorly in two eyes, and definitely posteriorly in the remaining nine eyes.

Conclusions

From the foregoing experiments one is justified in concluding: 1. That a localized form of tuberculosis can be produced in the ciliary body experimentally, and in a large proportion of the animals the primary lesion could be confined to the pars plana at the onset of the disease.

2. That migration from the posterior portion of the ciliary body occurs in three directions:

a. Into the vitreous.

b. Posteriorly into the choroid, occasionally into the retina and optic nerve.

c. Anteriorly into the iris, anterior chamber, ligamentum pectinatum, and episclera.

3. The vitreous was involved in all but two eyes, and the experiments would lead one to believe that vitreous exudate was present in tuberculosis of the posterior portion of the ciliary body.

4. Vitreous exudates in the earlier stages are characteristic of tuberculosis, and histologically are true tubercles consisting of epithelioid cells, small round cells, often fibroblasts which occasionally have caseated centers.

5. The vitreous tubercles vary from 1/10 to 1/2 mm. in diameter, are usually round, or oval, but occasionally are club shaped.

6. A generalized cloudiness of the vitreous occurs and is due to the exudation of fibrin and isolated cells.

7. In the later stages the cells are more numerous in the posterior vitreous in front of the so-called hyaloid membrane.

8. The retina is astonishingly free from tuberculous invasion, and when affected the extension was from the choroid in a vast majority of cases.

9. A perivasculitis of the retinal vessels occurred in several eyes and apparently the extension came from the vitreous rather than along the perivascular lymph spaces.

10. In the cases of perivascular extension, involvement was confined to the nerve-fiber layer of the retina in

the region of the affected vessel. Extension did not take place into the deeper layers of the retina.

11. In all cases multiple tubercles eventually appeared in the choroid.

12. Anterior migration occurred much less frequently than posterior extension. Gilbert-Koeppe nodules were found in four eyes and deposits on the posterior surface of the cornea in only five cases.

13. Fibrinous exudate into the anterior chamber was found histologically in the majority of eyes.

14. In the anterior chamber cells were found histologically in none of the cases.

15. The ligamentum pectinatum was invaded in one case.

16. In only one instance extension occurred into the episcleral tissue by the scleral corneal margin.

17. Four of the animals were made allergic by previous introduction of tubercle bacilli into other portions of the body. The disease was more wide spread and ran the course much more rapidly than in those that were non-allergic.

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Bibliography

[1] Maitre Jan. Traité des maladies de l'œil. Troyes, 1707, p. 456.
[2] Jaeger, C. F. Ueber Markschwamm des Auges und amaurotisches Katzenauge. Würzburg, 1831, p. 78.
[3] Koch, R. Die Aetologie der Tuberculose. Berl. klin. Wchnschr., 1882, v. 19, pp. 221-230.
[4] Friedrich and Nosske. Ziegler's Beiträge, 1899, p. 470.
[5] Stock, W. Pathologisch-anatomische Untersuchungen über experimentelle endogene Tuberculose der Augen beim Kaninchen. Klin. Monatsbl. f. Augenh., 1903, v. 41, p. 17.
[6] Lawson, A. Diagnosis and treatment of ocular tuberculosis. Trans. Ophth. Soc. U. Kingdom, 1921, v. 49, pp. 52-53.
[7] Verhoeff, F. Histologic findings in tuberculous cyclitis. Trans. Amer. Ophth. Soc., 1910, v. 12, pt. 2, pp. 560-566.
[8] Fleischer, B. Arbeit auf dem Gebiete der pathologischen Anatomie und Bakteriologie. Leipzig, v. 14, p. 12.
[9] Lagrange, F. Observation de tuberculose primitive du corps ciliaire et de l'iris. Arch. d'Opht., 1895, v. 15, pp. 170-175.
[10] Otori, K. Experimental primary retinal tuberculosis. Arch. f. Augenh., v. 79, p. 44. Ophthalmic Year Book, 1912, v. 15, p. 190.
[11] Finnoff, W. C. Changes found in eyes of rabbits following injection of living tubercle bacilli into the common carotid artery. Amer. Jour. Ophth., 1924, v. 7, No. 2, pp. 81-89.
[12] ———. The relation of tuberculosis to chronic uveitis. Amer. Jour. Ophth., 1931, v. 14, No. 12, pp. 1208-1227.
[13] von Szily, A. Ueber Wandertuberkel. Klin. Monatsbl. f. Augenh., 1931, June, pp. 13-32.

COMPLETE DISCISSION OF THE CRYSTALLINE LENS

1. Preliminary Report of Clinical and Experimental Studies

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Complete discission of the crystalline lens is recommended in cases of congenital, juvenile, and traumatic cataract and in high myopia. It is preferred to anterior capsulotomy, which often requires a secondary operation. The iris is widely dilated and a single, straight, subconjunctival incision is made in preference to a corneal incision because of the lessened danger of infection. From the Lighthouse Clinic for the Prevention of Blindness. Research funds from the Ophthalmological Foundation, Inc. Read before the American Academy of Ophthalmology and Otolaryngology, September 23, 1932, at Montreal, Canada.

Congenital cataract caused blindness in approximately 15 percent of the pupils in residential and day schools for the blind in the United States in 1931. This condition accounted for more blindness than any other single disease (table 1). In one New York school for the blind[1] 27 children (20 percent) were blind because of congenital cataract, and operation on 13 of these patients (10 percent of the inmates) was unsuccessful. Thus the selection of the operation for congenital and juvenile cataract is important in the prevention of blindness.

Table 1

DISEASES OF THE EYE CAUSING BLINDNESS AMONG PUPILS IN RESIDENTIAL AND DAY SCHOOLS FOR THE BLIND IN THE UNITED STATES IN 1930–1931*

	Total	Percent
Number of pupils	5286	100
Disease		
Congenital cataract	782	14.8
Other congenital causes	734	13.9
Ophthalmia neonatorum	717	13.6
Trachoma	69	1.3
Progressive myopia	142	2.7
Interstitial keratitis	161	3.0
Phlyctenular keratitis	45	.9
Optic nerve atrophy	655	12.4
Chorioretinitis	155	2.9
Retinitis pigmentosa	97	1.8
Accidents	423	8.0
Infantile glaucoma	153	2.9
Other causes	1153	21.8

* Table prepared from data furnished by the National Society for the Prevention of Blindness.

In this consideration of the operation known as "complete discission of the crystalline lens" the term "discission" is defined and limited, in accordance with its derivation, to a cutting through of the entire lens with its capsule, hence it is usually referred to as the "through and through" operation.

Complete discission of the lens has been employed successfully in treating congenital, juvenile, and traumatic cataracts and is also useful in myopia of high degree.

The reasons for presenting the subject of complete discission of the crystalline lens may be summarized as follows:

1. The high percentage of blindness due to congenital cataract and the large number of unsuccessful operations for this condition.

2. Complete discission of the lens has been criticized by eminent surgeons but our experience in the majority of cases apparently does not support their objections.

3. The technic herein described differs from Ziegler's[2] original technic in that a subconjunctival incision at the limbus has been substituted for the corneal incision, and the single straight incision through the lens has apparently yielded as good results as the inverted V-shaped incision and is a simpler procedure.

4. Preliminary iridectomy which was formerly combined with complete discission has not been performed in cases operated on in recent years. Possibly the results have been less successful in certain cases because preliminary iridectomy had not been performed.

5. This operation in our hands has afforded good results, comparable with the results of the older method of an-

terior capsulotomy. Postoperative reaction is apparently less in young patients. The number of operations is usually decreased. In the last five years, since the incision in the anterior and posterior capsules has been made longer and the single straight incision through the lens has entirely replaced Ziegler's inverted V-shaped incision, the results have been satisfactory except in older patients.

History of Discission.

In 1808, Percival Pott[3] discovered that a cataract would be "dissolved" by the action of the aqueous if the capsule of the lens were freely lacerated. In 1803, Hey[4] stated he always endeavored to tear off a portion of the capsule in order to let "the aqueous humor flow upon the broken cataract." To Saunders[5] (1811) must be accorded the honor of discovering and adapting the principle of discission of the lens in congenital cataract. He used the original model of Hey's knife-needle (sharpened on both edges). In 1830, Guthrie[6] completely divided the lens by an incision posterior to the iris using a curved knife devised by Langenbeck[7] which closely resembles the Ziegler knife-needle. No mention of complete discission of the lens by an incision anterior to the iris apparently appears in the literature prior to Ziegler's[8, 9, 10] publication of his practical method. Ziegler's operation was approved by Chance[11] in 1923 and Zentmayer[12] in 1922 found it useful in traumatic cataracts.

Preliminary iridectomy was practiced by von Graefe and was again proposed in 1871 by Meyer and de Montméja[13] who advised preliminary iridectomy in all patients over fifteen years of age. These surgeons performed iridectomy with anterior capsulotomy. More recently Bell[14] suggested combining iridectomy with Ziegler's complete discission of the lens, and reported 100 cases operated on by this method.

Although we saw no complications in the series of cases operated on by Bell we agree with Radcliffe[15] that preliminary iridectomy which was so valuable in the older methods of discission is seldom necessary in complete discission of the lens in young patients. However, experience recently gained may indicate the advisability of performing preliminary iridectomy in patients over 10 years of age if complete discission is to be performed in preference to linear extraction following anterior capsulotomy.

Advantages of Complete Discission.

The advantages of complete discission of the lens appear to be[16]: Fewer operations are required to obtain the same results; there is usually less reaction than after anterior capsulotomy; secondary increase in tension is less frequently encountered; danger of infection is probably less, for the number of operative procedures is usually reduced; preliminary iridectomy seems to be unnecessary in young patients and certainly is not so important as in anterior capsulotomy.

Objections to Complete Discission.

While the merits of complete discission are recognized by several ophthalmologists, adverse criticism has also been advanced.

Wilder[17] objects to the procedure on the basis of (1) undue reaction; (2) luxation of the lens by tearing the zonule; (3) delayed absorption of the cataract; (4) greater likelihood of the formation of membranous after-cataract.

Greenwood[18] and McReynolds[19] agree with Wilder. McReynolds adds that cutting into the vitreous causes slow absorption.

Fisher[20] prefers the Graefe incision, capsulotomy, and peripheral iridectomy.

Wiener[21] who has had twenty-three years' experience with the Ziegler operation approves of this procedure, but objects to the subconjunctival incision at the limbus. He believes that Ziegler's method of making the puncture within the cornea should be followed.

Indications and Contraindications for Complete Discission.

Age.—In soft cataract complete discission of the lens may be performed

from birth to the age of thirty-five years. The earlier an operation is performed the better, but the teething period should be avoided and we usually prefer to wait until the child is a year and a half to two years of age. Kirby[22] states that children with cataract develop amblyopia if they are not operated upon before they are four years old. Elschnig[23] advocates operation as early as the first weeks of life in order to prevent amblyopia. It may be practical to perform this operation on older patients but severe reactions and high tension resulted in two patients between 17 and 20 years of age. Discission of the anterior capsule was performed by Post[24] successfully on two patients, 35 and 37 years of age, and Czermak has performed anterior capsulotomy in selected cases up to 40 years of age. The age limit should also be considered in operating on the transparent lens in high myopia.

Obviously the method is not suitable for all cases of congenital or juvenile cataract. For example, it should not be used for congenitally subluxated cataractous lenses, for the loosely attached lens would recede from the instrument or might be completely luxated.

Phaco-anaphylaxis, unless desensitization is complete, may be a contraindication. Chronic infections which cannot be eliminated would make it advisable to perform anterior capsulotomy and linear extraction.

The slitlamp examination will show the relative size of the embryonic, fetal, and adult nuclei. A diffuse grayish haze or brownish color, such as one frequently sees in senile lenses, indicates a hard sclerosed nucleus tending to resist absorption.

Preliminary Preparation for Operation.

Determine the patient's sensitiveness to lens protein by means of the intracutaneous test with solutions of lens protein 1:10, 1:100, 1:1000. If he is hypersensitive he should be desensitized before operation by the method suggested by Verhoeff and Lemoine[25]. Several patients who had congested eyeballs following operations, were considered to have had phacogenetic, not phaco-allergic, endophthalmitis as intradermal tests with lens antigen were negative. One patient who had a zonular cataract[26] (table 3, case 2) was sensitive to lens antigen. He was desensitized prior to operation and a good result was obtained.

The general condition of the patient should be determined. The Wassermann test should be made. The possibility of focal infections from the nasal accessory sinuses, teeth, tonsils, adenoids, and other sources should receive careful consideration.

Examination of the eye should be made with especial attention to chronic obstruction and inflammation of the nasolacrimal passages.

Cultures from the conjunctival sac, on blood agar, should be made two or three days before operation. If pathogenic organisms are found, operation should be deferred.

Instruments Required.

Speculum
One fixation forceps (with catch)
One fixation forceps (without catch)
One mousetooth forceps
Ziegler knife-needle with long curved blade (size selected according to diameter of the lens and pupil when dilated)
Spatula probe
Lid retractor

Preparation for the Operation.

The pupil is completely dilated with atropine fortified by epinephrine. This method was advocated by Dascalopoulos[27] in operations for traumatic cataract. The advantages of subconjunctival epinephrine injections have been enumerated by Barkan[28].

Technic of the Operation.

After complete mydriasis is obtained the conjunctiva is nicked with scissors 6 millimeters from the limbus in an area dried and painted with a 5 percent solution of mercurochrome. A well-curved Ziegler knife-needle is then passed subconjunctivally. The flat of the needle is held parallel to the plane of the iris and thrust through the sclera 0.5 millimeter from the limbus.

The lens is cut through from below upward with a gentle sawing motion and a single straight incision is made. This incision has also been advocated by Parker. Our experience differs from that of Ziegler in two respects: first, Ziegler believes that it is never necessary to cut the secondary membrane, while four of our patients required secondary operations; second, that the corneal route is to be preferred to the subconjunctival method of approach because a better fulcrum is made and there is less danger of puncturing the iris or the ciliary body. Our belief is that the subconjunctival incision is safer from the standpoint of preventing infection. The cornea depends entirely upon its lymph supply for nourishment and is therefore more susceptible to infection.

Complications To Be Avoided.

The lens should not be dislocated. This complication is usually avoided if a gentle sawing motion is used.

The iris should not be punctured and the edge of the pupil should not be nicked.

When making the lens puncture below, care should be taken not to injure the ciliary body.

The danger of increased tension as a result of complete discission has been thoroughly investigated by Alvis[20]. His experiments with rabbits showed that simple discissions of the anterior capsule and cortex were followed by increased tension and slow absorption, while complete discissions were followed by decreased tension and rapid absorption.

Discussion of Our Experiments on Animal Eyes Tabulated in Table 2.

Twenty-five rabbits and four guinea-pigs were operated upon and observed from December, 1931, to June, 1932. The operations attempted were complete discission of the lens by a straight incision on one eye, and anterior capsulotomy by a single straight incision on the other eye. One hour before operating the pupils were dilated with atropine, 1 percent, and epinephrine 1:1000. The eye was anesthetized with 2 percent holocaine and 4 percent cocaine before the operation. Tension was taken with the Bailliart corneal tonometer before the operation and twice weekly during the period of observation. A subconjunctival incision at the limbus with a Ziegler knife-needle was made in all but three rabbits, in the latter a corneal incision was made.

Increase of tension lasting several days was observed in 5 eyes; in 1 eye, on which an incomplete discission had been performed, the high tension persisted. On 2 of these eyes an incomplete discission and on the other 3 eyes a complete discission had been performed. A decrease of tension with marked reaction lasting two to five weeks developed in 8 eyes, the distribution between the two types of operation being about equal. One rabbit and 1 guinea-pig developed panophthalmitis in 1 eye (in both complete discission of the lens had been performed). The ease with which the rabbits' lenses were subluxated in 10 eyes (9 rabbits), especially during the secondary operations, was noteworthy. The guinea-pigs' eyes were so small and dark, that the field of operation was obscured.

Complete discission of the lens was performed on 33 eyes (26 rabbits and 2 guinea-pigs), including repeated operations. In 9 of these complete absorption of the lens was observed; in 15 eyes there was partial absorption of the soft lens matter. These animals are still under observation. Anterior capsulotomy was performed on 34 eyes. Rapid healing of the wound with scar formation in the anterior capsule or in the anterior layers of the lens invariably followed. On 21 of these eyes (14 rabbits) a secondary operation was necessary in order to produce swelling of the lens. Cataracts without absorption developed in 12 rabbits (17 eyes) equally distributed between the two types of operation. No secondary operation was undertaken on this group of animals because in certain of the animals the lens was subluxated and in the others the eyes were inflamed.

Table 2

EXPERIMENTAL DISCISSION OF THE LENS

	Complete discission				Anterior capsulotomy				Remarks
	Rabbits		Guinea pigs		Rabbits		Guinea pigs		
	Number of animals	Number of eyes	Number of animals	Number of eyes	Number of animals	Number of eyes	Number of animals	Number of eyes	
Total number of animals and eyes operated on	26	29	2	4	25	30	2	4	
Complications:									
1. Glaucoma		3		—		2		—	
2. Hypotony		4		—		4		—	
3. Panophthalmitis		1		1		—		—	
Subluxation of lens		7		—		3			Occurred mostly during secondary operations.
Results and conditions of lens:									Operations were repeated on 21 eyes.
Complete absorption		9		3		—			
Partial absorption		15		—		—			
Cataract without absorption		8		1		9			
Scar in the anterior capsule of the lens		—		—		21		4	

Results of complete discission of the human lens

Congenital Cataract.

Of 19 patients with congenital cataract upon whom complete discission of the lens was performed, 6 had postoperative complications. In one of these patients incarceration of the iris in the wound produced a slightly irregular pupil. Increased tension was noticed in 4 cases (table 3, Nos. 6, 18, 19, 21). In two cases (6, 18) linear extraction was necessary.

The patient in case 18 obtained good vision with correction. In case 21 the high tension subsided under miotics and the patient obtained good vision with correction. Case 19, a young woman 21 years of age, was discharged with normal tension, but returned to the clinic ten days later with a painful, blind eye; tension was 55. After linear extraction the pupil was black but there was no light perception.

The other patient with postoperative complications was a child three years of age. The child's mother, a nurse, reported that the general condition was normal and the Wassermann test was refused. Syphilis was considered the cause of convulsions and iridocyclitis which followed the second operation on the right eye. Hemiplegia and facial paralysis also developed at the time of operation.

It was necessary to incise the secondary membrane in three cases.

Traumatic Cataract.

Complete discission of the lens was the method of treatment employed in four cases of traumatic cataract. Two of these patients presented postoperative complications. Patient 2 was hypersensitive to lens protein and was desensitized before the operation. However, he developed an endophthalmitis phacogenetica and a low-grade iritis. A mild iritis with the formation of in-

Table 3

RESULTS OF COMPLETE DISCISSION OF THE HUMAN LENS

Number of Patient	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Age	8	17	17	3	13	13	14	17	17	26	2½	15	18	18	4
Sex	F	M	F	M	M	M	M	F	F	F	M	F	M	M	M
Diagnosis:															
1. Congenital Cataract	O.U.		O.D.	O.U.	O.D.	O.S.	O.D.	O.D.	O.S.	O.S.			O.D.	O.S.	O.D.
2. Traumatic Cataract		O.D.									O.S.	O.S.			
3. Nystagmus	O.U.		O.D.												
4. Aniridia													O.D.	O.S.	
5. Aphakia															
6. High Myopia															
Date and Type of Operation and Eye Operated Upon:	O.D.	O.D.	O.D.	O.D.	O.D.	O.S.	O.D.	O.D.	O.S.	O.S.	O.S.	O.S.	O.D.	O.S.	O.D.
1. Iridectomy			8/15/27	6/18/27			3/18/25					11/9/25			
2. Needling Prior to Complete Discission			9/27/27		8/31/26										
3. Complete Lens Discission	3/27/28	2/5/27	2/28/28	6/30/25	12/17/28	6/18/27	6/22/25	2/4/28	9/1/28	2/4/28	11/5/27	11/16/25	1/2/21	1/22/21	5/29/31
4. Paracentesis and Removal of Soft Lens Matter						7/7/27*									
Complications:															
1. Hypertension						O.S.									
2. Hypotonia with Iritis		O.D.									O.S.				
3. Hyphemia				O.D.											
4. Incarceration of Iris						O.S.									
5. Endophthalmitis Phacogenetica		O.D													
6. Phaco-anaphylaxis					O.D.										
Condition of Lens:															
1. Secondary Membrane without Opening	O.D			O.D.	O.D.							O.S.			
2. Good Opening in Membrane		O.D.	O.D.						O.S.	O.S.			O.D.		O.D.
3. Partial Absorption of Lens						O.S.	O.D.	O.D.			O.S.			O.S.	
Vision Before Operation:															
O.D.	2/200	18/200	2/200	—	20/200	—	20/70	L P.	—		—	20/30	L.P.	—	20/200
O.S.	20/200	20/30	20/100	—	—	20/200	20/100	—	4/200		—	L.P.	—	5/200	—
Vision After Operation with Correction:															
O.D.	15/200	20/25	4/200	—	20/70		20/50				—	20/30	20/200		20/50
O.S.	20/200	20/20	20/100	—	—	20/200	20/50				—	L.P.			

Table 3 (Continued)

Number of Patient	16	17	18	19	20	21	22	23	24	Total	Remarks
Age	4	25	17	21	7	17	3	18	29	{M-14 F-10	
Sex	M	M	M	F	M	F	F	F	M		
Diagnosis:											
1. Congenital Cataract	O.S.		O.U.	O.U.	O.U.	O.D.	O.S.		O.U.	19	
2. Traumatic Cataract		O.D.								4	
3. Nystagmus										2	
4. Aniridia										2	
5. Aphakia						O.S.				1	
6. High Myopia								O.U.		1	
Date and Type of Operation and Eye Operated Upon:	O.S.	O.D.	O.D.	O.S.	O.S.	O.D.	O.S.	O.U.	O.D.		
1. Iridectomy											
2. Needling Prior to Complete Discission									{1/19/29 2/2/29 2/13/29	4	Case 3—Recession O.U. 3½ mm. because of esotropia.
3. Complete Lens Discission	1/2/31	7/9/29	1/29/32	1/29/32	12/11/31	2/19/32	4/15/32	1922	8/23/29	5 24	
4. Paracentesis and Removal of SoftLens Matter			3/11/32*	2/17/32*						3	*Washing out of anterior chamber because of high tension in 3 cases.
Complications:											
1. Hypertension			O.D.	O.S.		O.D.				4	Case 4—Following convulsions and iridocyclitis, left hemiplegia and facial paralysis developed after second operation, probably due to luetic disease of the brain.
2. Hypotonia with Iritis										2	
3. Hyphemia										1	
4. Incarceration of Iris										1	
5. Endophthalmitis Phacogenetica										1	
6. Phaco-anaphylaxis										1	
Condition of Lens:											
1. Secondary Membrane without Opening										4	Case 5—was desensitized before operation.
2. Good Opening in Membrane	O.S.	O.D.	O.D.		O.S.	O.D.	O.S.		O.D.	13	
3. Partial Absorption of Lens				O.S.						6	
Vision Before Operation:											Case 3—Choroidal changes in right fundus.
O.D.	—	5/200	20/70	20/70	20/70	4/200			16/200		Case 19—Returned in 3 weeks with a painful, hard and blind eye.
O.S.	20/200	20/20	20/70	4/200	H.M.	20/30 cc.			20/50		
Vision After Operation with Correction:											Case 24—Deposits on Descemet's membrane before operation which remained unchanged after operation.
O.D.		20/100	20/30		20/70	20/30	—	Vision	20/40		
O.S.	20/50	20/20		No L.P.	20/30	20/30	—	greatly improved	20/50		

complete posterior synechiae was the only unfavorable postoperative reaction in another case (case 11).

It was necessary to incise the secondary membrane in one case.

High Myopia.

The result of complete discission in one case of high myopia was good.

In a number of the patients operated upon it was impossible to obtain the final vision from the incomplete clinic records.

Postoperative Visual Acuity.

The results in 24 cases were as follows: In 10 cases vision was improved in varying degrees from 20/200 to 20/20; in 3 cases it could not be improved above 20/200; vision was unchanged in 2 cases; 3 operations were performed on children whose vision could not be determined; 5 cases were clinic patients who were not followed up; and 1 patient became blind.

Summary

1. The method of operation for congenital and juvenile cataract assumes greater importance after consideration of statistics which show that congenital cataract is the cause of blindness of 14.8 percent of the pupils in schools for the blind in the United States. In one New York school for the blind 10 percent of the inmates have been unsuccessfully operated upon for congenital cataract in both eyes.

2. The danger of hemorrhage from an incision through the vascular limbus and the slightly increased technical difficulty are offset by greater safety from infection assured by the subconjunctival incision.

3. The single straight incision is a simpler technical procedure than the inverted V-shaped incision. It may be performed with less traumatism and the results are apparently as good as with the incision advocated by Ziegler.

4. If the iris is widely dilated with atropine and epinephrine, the subconjunctival incision may be made as easily as when an iridectomy has been performed. Preliminary iridectomy seems unnecessary in patients under ten years of age, provided a thorough preoperative examination has been made.

5. Complete discission of the lens by a single straight incision in rabbits and guinea-pigs resulted either in complete or partial absorption of the soft lens matter, while anterior capsulotomy by a single straight incision invariably led to scar formation in the anterior capsule, and a secondary operation was always necessary.

6. Increase of tension and inflammation of the eye with hypotonia was observed in approximately the same number of the experimental-animal eyes, irrespective of the type of operation.

7. The lens of the rabbit subluxates easily and is so thick that complete discission is more difficult to perform than on human eyes. Guinea-pigs' eyes because of the size and dark color are not suitable for experimental complete discission or partial discission of the crystalline lens.

8. In 24 operations on human eyes there were 2 serious complications. Severe iridocyclitis and left hemiplegia developed in a child with unrecognized syphilis. This complication could possibly have been avoided if the Wassermann test had been made. In one case hypertension was the cause of complete blindness because the patient did not return to the clinic and the lens matter was not expressed early enough. Increased tension in two other cases necessitated linear extraction. It was necessary to incise the secondary membrane in four cases.

9. The advantages of complete discission over anterior capsulotomy appear to be: Fewer operations are usually required, thus reducing the danger of infection; reaction is less, and hypertension is less likely to occur.

Conclusion

Complete discission of the crystalline lense has afforded good results in the treatment of congenital, juvenile, and traumatic cataracts and in high myopia. It would be unfortunate if, because of adverse criticism, this procedure were to be discarded without further trial.

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References

[1] Personal Communication from Mr. E. M. van Cleve, Principal, New York Institute for the Education of the Blind, June 14, 1932.

[2] Ziegler, S. L. Complete discission of the lens by the V-shaped method. Jour. Amer. Med. Assoc., 1921, October, v. 77, p. 1101.

[3] Earle, J. Chirurgical works of Percival Pott. London, Wood and Innes, 1808, v. 3, p. 156.

[4] Hey, W. Practical observations in surgery. London, L. Hansard, 1803, p 60.

[5] Saunders, J. C. A treatise on some practical points relating to the diseases of the eye. London, J. M'Creery, 1811.

[6] Guthrie, G. J. Lectures on the operative surgery of the eye. London, Burgess and Hill, 1830, p. 352.

[7] Langenbeck, C. J. Prüfung der Keratonyxis, einer neuen Methode den grauen Staar durch die Hornhaut zu recliniren oder zu zerstückeln, nebst Erläuterung der Operationsgeschichte. Göttingen, J. F. Danckwerts, 1811.

[8] Ziegler, S. L. The history of iridotomy. Author's V-shaped method. Jour. Amer. Med. Assoc., 1909, February 13, v. 52, p. 539.

[9] Ziegler, S. L. The problem of the artificial pupil. Trans. Ophth. Soc. U. Kingdom, 1919, v. 39, p. 316.

[10] Ziegler, S. L. History of discission of the lens, with the technique of complete discission by the V-shaped method. Trans. Ophth. Soc. U. Kingdom, 1925, v. 45, p. 154.

[11] Chance, B. Results of deep incision of lens for congenital cataract. College of Physicians of Philadelphia, Sect. Ophth., November 15, 1923, Amer. Jour. Ophth., 1924, April, v. 7, p. 305.

[12] Zentmayer, W. Complete discission for traumatic cataract. Amer. Jour. Ophth. 1923, April, v. 6, p. 309.

[13] Meyer, E. and de Montméja, A. Traité des opérations qui se practiquent sur l'oeil. Paris, H. Lauwereyns, 1871.

[14] Bell, G. H. Operation for juvenile cataract in two stages. Amer. Jour. Ophth., 1926, June, v. 9, p. 433.

[15] Radcliffe, McC. Advantages of complete discission by the V-shaped method. Amer. Jour. Ophth., 1924, October, v. 7, p. 766.

[16] Berens, C. Discussion of Dr. W. H. Wilder's paper, The operative procedures and method of handling juvenile cataract. Trans. Amer. Acad. Ophth., 1928, p. 128.

[17] Wilder, W. H. The operative procedures and method of handling juvenile cataract. Trans. Amer. Acad. Ophth., 1928, p. 113.

[18] Greenwood, A. Discussion of Dr. W. H. Wilder's paper, The operative procedures and method of handling juvenile cataract. Trans. Amer. Acad. Ophth., 1928, p. 125.

[19] McReynolds, J. O. Discussion of Dr. W. H. Wilder's paper, The operative procedures and method of handling juvenile cataract. Trans. Amer. Acad. Ophth., 1928, p. 126.

[20] Fisher, W. A. Discussion of Dr. W. H. Wilder's paper. The operative procedures and method of handling juvenile cataract. Trans. Amer. Acad. Ophth., 1928, p. 127.

[21] Wiener, M. Discussion of Dr. W. H. Wilder's paper, The operative procedures and method of handling juvenile cataract. Trans. Amer. Acad. Ophth., 1928, p. 129.

[22] Kirby, D. B. Personal communication.

[23] Elschnig, A. Starbildung bei Mongoloider Idiotie. Med. Klin., 1932, February, v. 28, p. 217.

[24] Post, M. H. Report of needling a cataract in a patient thirty-five and another thirty-seven years of age. Amer. Jour. Ophth., 1909, v. 26, p. 33.

[25] Verhoeff, F. H., and Lemoine, A. N. Hypersensitiveness to lens protein. Patient desensitized and successfully operated on for immature cataract. Amer. Jour. Ophth., 1922, v. 5, p. 700.

[26] Berens, C., Losey, R. R., Hardy, L. H., and Meek, R. E. Studies in immunology in relation to ophthalmology. First communication: Outline of diagnosis and biologic therapy, with special reference to lens antigen in diagnosis and treatment and serum therapy. Atlantic Med. Jour., 1927, June, v. 30, p. 547.

[27] Dascalopoulos, N. L'usage de l'adrenaline dans l'opération de la cataracte traumatique. Ann. d'Ocul., 1928, v. 165, p. 251.

[28] Barkan, O. A procedure for the extraction of congenital, soft and membranous cataracts. Amer. Jour. Ophth., 1932, February, v. 15, p. 117.

[29] Alvis, B. Y. Personal communication to Doctor Ziegler, concerning experimental work in simple and complete discission. Trans. Ophth. Soc. U. Kingdom, 1925, v. 45, p. 179.

A NEW STITCH IN CATARACT OPERATION

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Human hair is used for this simple stitch, which is inserted prior to the cataract incision and serves to coapt the edges of the wound and to cover the incision. The author has used this procedure in eleven cases with uniformly good results, discarding the conjunctival flap in its favor.

In the winter of 1926-27, while doing some eye work in the Vienna clinics, several severe lacerations of the cornea were seen, which were sewed together with human hair. Not one of them had an irritation from the material used for suturing the wounds and,

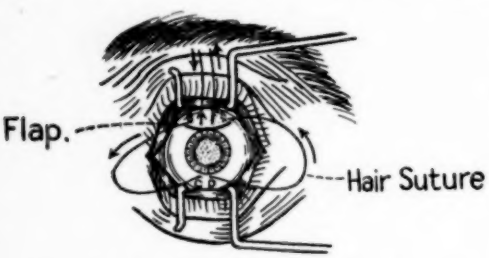

Fig. 1 (Van Poole). The stitch placed in a conjunctival flap, 10 mm. wide, dissected 5 mm. back from the limbus.

reasoning along that line, I thought that perhaps hair would be unirritating if left in contact with the cornea for some time. I secured some human hair of rather coarse fiber and also used fine horse hair, but I think human hair is better for the procedure I am about to describe.

In my first endeavors, I dissected up a conjunctival flap above; beginning at the junction of the conjunctiva and cornea, the flap part was dissected up about 5 mm., and was about 10 mm. in width. I then placed a stitch of human hair as illustrated in my rough sketch figure 1, beginning at a point marked (a) and let the needle go through the conjunctival flap and out again at the point marked (b). Then the hair was pulled through so that I had plenty of length to carry the needle below the cornea. It was entered at a point marked (c) and brought out at the point marked (d). This gave a good anchorage in the conjunctiva about 5 mm. below the sclero-corneal junction. The suture was pulled through sufficiently to allow plenty of length and the needle was again entered at point (e) and brought out at (f). The ends of the suture were tied in a single knot above and anchored by hemostats to a towel.

This gave plenty of room to separate the two sutures by pulling them widely apart while the cataract incision was being made. The usual combined extraction was performed and following the delivery of the lens, the two ends of the stitch were pulled taut, which brought the junctival flap down over the incision.

After this had been tried a few times, I abandoned dissecting up a flap of conjunctiva and now place my first suture as before except it is in the conjunctiva that has not been dissected up as shown in figure 2.

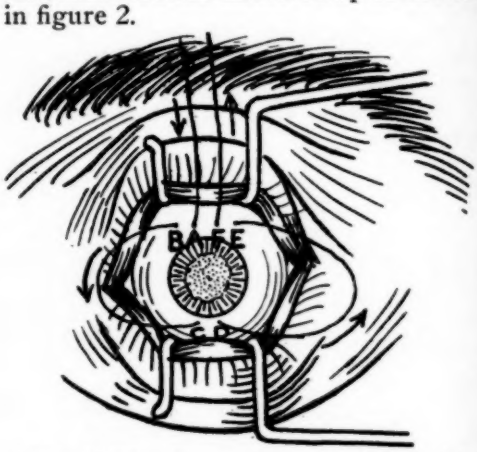

Fig. 2 (Van Poole). The stitch placed in the undissected conjunctiva.

The small sutures lie parallel with each other across the cornea and they are sufficiently strong to bring the edges of the wound into apposition and prevent any gaping. The conjunctiva is so loose that it is pulled up from below and down from above, actually forming a covering over the incision (fig. 3).

After the suture has been tied, the whole field can be reviewed and if the edges of the wound are not coapted, they can be adjusted with a small spatula.

At first I left the suture in only two days but soon learned that this time limit was too short, so it was lengthened to three, later to four, and then to five days. The best result seems to have been obtained by leaving the stitch in for four days before removing it.

This stitch is much simpler and easier to apply than one placed in the conjunctival flap at the upper edge of the incision after the incision has been completed. It is also easy to tie after the lens has been delivered, because one loop of the knot has been placed before the incision is made and can be tightened even in a very unruly patient. Should vitreous present after delivery of the lens, the stitch can easily be tightened to prevent its escape.

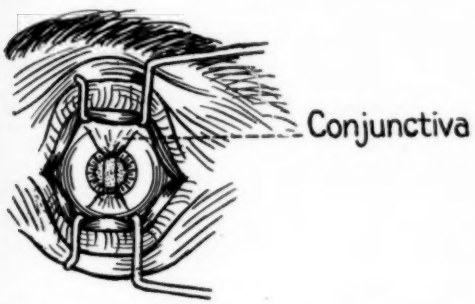

Fig. 3 (Van Poole). The conjunctiva drawn over the wound.

In cutting the ends of the stitch, leave them rather long, to facilitate its removal later on. The stitch is removed by cutting the two hairs across the cornea with a small pair of scissors and grasping one end of the lower part, which will come out very easily. Then gently raise the upper lid and catch the ends of the knot, which were cut rather long for this purpose, and the upper half of the stitch can be removed.

I have yet to see a case in which the hairs by resting in contact with the cornea caused an abrasion or ulcer. Nor do the long ends of the knot above, if human hair has been used, cause any irritation to the under surface of the upper eyelid.

The advantages of this stitch are: (1) the simplicity of its application; (2) its application before the cataract incision is made; (3) the accurate coaptation of the edges of the wound; (4) the non-irritability of the material used; (5) the ease with which it can be removed.

CYST OF THE UVEAL LAYER OF THE IRIS

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This case had the unusual feature of having been discovered during routine examination in an apparently normal eye with undiminished vision. The cyst evinced in the characteristics of translucency and tremulousness the established signs for the differential diagnosis. The case was presented before the New York Academy of Medicine, Ophthalmological Section, on February 16, 1931. From the Department of Ophthalmology, Bellevue Hospital and University, Bellevue Medical School.

Cysts of the uveal layer of the iris are of considerable interest because of their rarity, and because of the theories which have been advanced as to their etiology.

In 1852, Wharton Jones[1] reported a delicate cyst of traumatic origin protruding from the posterior into the anterior chamber. The lower part of the iris had been detached from its ciliary connection and pushed upwards. The cyst was punctured and this was followed by considerable inflammation. There was recovery with perfect sight. In 1864, Bosteels[2] was probably the first to describe a spontaneous cyst of the uveal layer of the iris, there having been no history of trauma or previous inflammation. It was a rounded tumor of an opaque, brown color, contrasting strongly with the blue color of the iris, to which organ it adhered, or rather, of which it formed a part, having been developed from the muscular coat of the uvea. There had been no previous inflammation nor injury. He drew it out through an incision, but the cyst was very friable and tore. This was followed by a severe inflammation. Hulke[3] in 1869 was the first to describe a series of cysts of the iris. He abstracted 19 reports, two of which involved the uveal layer.

In 1892, Greeff[4] described a cyst of the iris lined by pigment epithelium, which had occurred five years after cataract extraction. The eye was removed because of iridocyclitis. Two cysts were found behind and attached to the iris but springing from the ciliary body. He thought they were due to a gradual distention of a closed space in the ciliary processes, formed by the adhesion of their surfaces during an attack of postoperative iridocyclitis. In 1893, Collins[5] in an extensive report of intraocular cysts, described three which involved the pigment layer of the iris. One case, which was spontaneous, he thought to be a melanotic growth, or cyst. He said, "This case, it will be seen, differs from all those previously mentioned in that there was no history nor the least sign of inflammation, yet the cyst had uveal pigment on its anterior wall." The second case followed an injury with scissors. The eye was painful and he enucleated it. In describing the microscopic appearance of the cyst, Collins said: "That the separation of the two layers should become so extensive as to give rise to the appearance of a tumor, has not, I think, before been suggested." He also described a cyst occurring in a case of sarcoma growing in the ciliary body. He thought that pressure of this tumor on the base of the iris gave rise to effusion of fluid between its two uveal layers. In 1896, Eales and Sinclair[6] made the clinical diagnosis of a cystic condition of the uveal pigment. The eye was enucleated for painful glaucoma. In 1897, Zimmerman[7] reported a case of bilateral melanotic tumors, probably cysts of the ciliary bodies. This patient was also seen by Drs. Edward Jackson and Harlan. The first diagnosis was a melanosarcoma; the final, was a cyst. Jackson[8] pointed out that had the case been uniocular, enucleation would have been done even though the vision was good.

In 1904, Schieck[9] described the case of a female aged twenty-two years, in whom a diagnosis was made of melanosarcoma and the eye enucleated. Three pigment cysts were found arising from the posterior surface of the iris and ciliary body. He also reported a case in which the eye was removed because of

phthisis bulbi and in which discovery of a cyst was accidental. In 1904, Rabitsch[10] reported a case in a male aged fifty-four years, with a cyst that was accidentally found on the anterior surface of the ciliary body and root of the iris in an enucleated, myopic eye. In 1905, Mayou[11] reported on "cysts of the pigment layer of the iris." He had first noticed one in the eye of a sixty-seven-year-old man when the pupil was dilated for refraction. In 1906, a case was observed by Wintersteiner[12] in a male aged twenty-eight years. The cyst was noticed accidentally upon dilatation of the pupil. A diagnosis of sarcoma was made and the eye enucleated. The microscopic report was: a vesicle with its walls as formed by cleavage of the epithelial layer of the iris. Several other cystic formations were on the posterior surface. In 1906 Wintersteiner and Asayma saw another such instance. The latter sent to Wintersteiner an eye which he had enucleated from a patient because of glaucoma with pain. Wintersteiner found a cyst which he thought was analogous to his own and which he attributed to the same formation. He thought the cyst must have brought on the glaucoma. In 1907, Bickerton and Clarke[13] reported a cyst of the iris in a female aged thirty-six years. The mass, which appeared to be a sarcoma, increased in size, pushing the iris forward. As the eye was painful an iridectomy was performed, removing the growth, which was found to be a simple cyst. In 1908, Coats[14] reported "An unusual form of cyst of the iris." The diagnosis of sarcoma was made and the eye enucleated. He said, "With regard to classification of this tumor, it need hardlly be pointed out that it has no resemblance to those cysts of the iris and ciliary body which arise from the collection of fluid between the layers of the epithelium, as reported by Collins, Eales and Sinclair, Zimmerman, and Mayou." In 1909 Ichikawa[15] had such a case in a male, aged six years, with amaurotic family idiocy. The eye was removed at autopsy. A cyst of the anterior part of the ciliary body, close to the root of the iris, was found, which he considered analogous to the case reported by Wintersteiner.

In 1910, Pagenstecher[16] observed in a male, aged sixty years, a brown-black tumor projecting into the pupillary area. The diagnosis of sarcoma was made and the eye enucleated. The microscopic examination disclosed a cyst, due to the separation of the pigment epithelium. There were numerous other cysts of the pigment layer of the ciliary body and iris. In 1910, there was a case described by Worth[17] in a female aged five years, who had a cyst of the pigment epithelium of the iris. Two brown cysts at the pupillary margin were faintly translucent. They were spontaneous in that there was no history of inflammation or trauma. In this same year Gilbert[18] observed an occurrence in a female, aged sixty-seven years. The eye was cataractous. A year after the cataract extraction, glaucoma developed and the eye was enucleated. Behind the iris was a benign tumor and a multilocular cyst, the walls of which were composed of pigmented epithelium. He thought that the cysts were primary and the tumor secondary, and suspected that the cyst had been present clinically. In 1914, a case was reported by Weeks[19] entitled "A case of symmetrical occlusion of the pupils by the development of cysts and small solid masses from the uveal layer of the iris." This was found in a female, aged twenty-eight years. Each pupil was occluded by small spherical masses varying in size. He thought they were congenital in origin consequent upon a slowly progressive, irregular hyperplasia of the cells of this layer, and to edema. In 1916, Stephenson[20] described a case, a cyst of the pigment epithelium of the iris, which was found accidentally in a female, aged forty-three years. A diagnosis of melanosarcoma was made. Projecting from behind the pupillary edge of the lower temporal segment of the iris was a single, smooth, rounded mass, dark-brown in color, not tremulous, which looked solid and was not translucent. The eye was enucleated. The microscopic examination showed several small cysts, formed by a separation of the uveal layers of the iris and a much larger cyst situated behind the

iris, extending into the pupillary area, and formed by the separation of the uveal layers with fluid. In 1919, Rados[21] reported two cases of pigment cysts of the iris, one of which was traumatic and the other spontaneous, but they were imbedded in the anterior part of the iris.

In 1920, a report was published by Fischer[22] whose case was in a male aged fifty-six years. During routine examination a tumor was seen projecting into the pupil. It was dark brown, mobile, opaque, and spontaneous in origin. Extraction was effected by iridectomy. Microscopic examination showed that the walls were formed of pigment epithelium. Concerning the genesis, he did not think it was due to cleavage of the pigment layer of the iris, but to a proliferation of epithelium. In 1921, there was a report by Bliedung[23]. A female, aged fifty-three years, had bilateral cataracts. In each eye a tumor projected into the pupil at several places. At iridectomy the cysts were removed. There was a recurrence in one eye after eleven months. Microscopic examination showed the walls to be formed of a single layer of pigment epithelium. The cyst was limited to the zone of the pupillary edge. In 1921, Vogt[24] observed four brown cysts of the pupillary pigment whose surfaces were smooth and had pigment granules upon them. The cysts were translucent. Glaucoma was present in these four cases. Two years later he quoted from a case reported by Lussi in which a spontaneous uveal cyst appeared in an eye without glaucoma. He quoted a case of pigment cyst seen by Fuchs in 1885. Fuchs in writing of pigment cysts of the iris stated, "Of course pigment cysts occur in the iris that do not spring from the stroma of the structure but owe their origin to an hypertrophy of the uveal layer. Not rarely they are seen as a row of small hemispherical projections at the pupillary margin of the iris." In 1923, a report by Remky[25] described the occurrence in a male aged thirty-four years. There was a black tumor behind the iris which was not translucent, and a cyst of the iris with walls composed of pigment epithelium. On the anterior ciliary processes were several smaller cysts communicating with the larger one.

In 1924, Braunstein[26] published his observations on a female, aged thirty-eight years. Several round tumors of brown color were seen coming from the posterior surface of the iris and projecting into the pupil. They were translucent. Electrolysis was attempted and then excision of the cyst. In 1925, Marbourg[27] reported a case in a female, aged twenty years. A brown mass was seen at the pupillary margin, which was thought to be a sarcoma and the eye was enucleated. The pathological report was: A multilocular cyst, which consisted of several layers of flattened squamous epithelium. The pigment epithelium of the iris covered the entire cyst. In this case there was a history of trauma. A second case was that of a male, aged twenty-four years, who had a history of trauma. A brownish tumor mass of the iris was seen, and under high magnification with the slitlamp a cilium was discovered in the wall of the cyst. In 1927, a case was described by Weissman[28]. An irregularly shaped tumor was seen in the eye of a female, aged thirty-six years. It projected from the posterior surface of the iris into the pupil, and was translucent. In the same year Lindenmayer[29] reported an occurrence in a female, aged thirty-eight years. A mass was seen projecting from behind the iris into the pupillary area which was not translucent. It was thought at first to be a sarcoma, but later a cyst. The case was not followed up.

In 1929, Wilmer[30] described a case in a male aged forty-eight years. There was a history of recurrent attacks of iritis. Both eyes showed total posterior synechiae with iris bombé. In one eye at the pupillary margin was a dark brown mass protruding from the posterior margin. The cyst was nontranslucent, granular, and restricted at the base. Its surface was seen to be stippled with pigment granules. Transfixion of the iris was performed, and later a sclerocorneal trephination with peripheral iridectomy. With the reduced tension the cyst collapsed. He also stated that

he had examined a patient in whom at the pupillary margin were seen some twenty or more minute pedunculated cysts, some of which were confluent. Quiet uveitis was present in both eyes. He said that he had found records of thirty-six cases of cysts of the uveal layer of the iris, thirty of which were primary, seven had been caused by injury, three were consequent on glaucoma after injury, and six followed occlusion of the pupil or glaucoma, his own case making the seventh. In 1930, a report was made by Granström[31]. A female, aged forty-seven years, had had no history of previous ocular disease or trauma. A tumor was seen behind the iris stretching forward into the pupil. It was nodular, yellow-grey in color, covered with pigment epithelium, and was continuous with the posterior surface of the iris—a translucent cyst. There was no increase in size and no operative procedure was performed. The tension and vision remained normal.

As to the pathogenesis of uveal cysts of the iris, Treacher Collins believed the cysts were formed in a separation of two layers of the pigmented retinal epithelium at the back of the iris due to interference with the lymph current in that organ. Fischer[22] stated: "Since the new embryological investigation seems to prove that the iris has only one layer of pigment epithelium, there would be no possibility of splitting the two layers of the iris." He thinks that they are formed by proliferation of pigment epithelium, which would be simple. Terrier[32] believed that they arise from closure of a crypt of the iris and its distention by the retained fluid.

Researches of Ida Mann[38], however, demonstrate that there is a double layer of pigmented epithelium which covers the posterior surface of the adult iris. The margin of the optic cup, as it grows forward, must consist of two layers continuous with the inner and outer walls of the cup, respectively. The anterior layer of the iris epithelium is obviously directly continuous with the outer wall of the optic cup and the posterior layer of the iris with the inner wall of the optic cup. At the third month, the remains of the span between the two layers of the optic cup can be seen as a little circular channel, which is known as the marginal sinus. At the fifth month it is very large but has disappeared by the seventh month. Therefore, a cyst of the uveal layer of the iris occurs between the two layers of epithelium on the posterior surface and can be considered as a dilatation of a persisting portion of the cavity of the primary vesicle and is possibly associated with failure of disappearance of the marginal sinus.

In discussing the differential diagnosis between melanotic tumors and cysts, Stephenson[20] said, "The points in favor of a cyst would be bilaterality, multiplicity, mobility, tremulousness, notching of the visible portion of the growth and translucency." However, in the case which he described, the cyst was neither tremulous nor translucent. It is interesting to note that in five cases reported, it was impossible to obtain transillumination. Possibly this is due to the dense pigmentation of the walls of the cyst. Mayou[11] said, "The point of importance with regard to these cysts is their differential diagnosis from melanotic tumors of the iris, the peculiar, notched irregular surface being, I think, an important factor in differentiating them." Wilmer[29] in concluding his paper said, "Melanosarcomas are found in a position similar to that of the spontaneous cyst. In some cases of primary cysts of the pigmented layer of the iris, their true nature can be ascertained only by the removal of a piece of the iris with the cyst. When the eye is painful and there is useful vision, this, or some similar procedure should be resorted to before enucleation."

Case report

The following case is reported because it presents a difficult and interesting problem of diagnosis and management. In the left eye, which was practically blind, there was a large ciliary staphyloma, while in the right eye which had normal vision, there was a small pigmented mass on the posterior surface of the iris. Mr. F. B., aged thirty-two years, was admitted to the

service of Dr. W. W. Weeks at Bellevue Hospital, January 5, 1931, with the complaint of recurrent severe pain and failing vision of the left eye for the past two or three years. These attacks of pain in the left eye and orbit were sudden in onset and lasted about a week at a time, diminishing gradually. They became more frequent and severe and the vision in the left eye decreased with each attack. The pain at the time of admission was excruciating and the vision was light perception.

There never had been any complaint regarding the right eye, its vision being 20/20. There was no history of injury or previous inflammation of the eye, but the examination with the slit-lamp showed small pigmented deposits on the posterior surface of the cornea. The pupil was regular, round, and reacted actively. The anterior chamber was normal in depth. The pupil was widely dilated. A brown tumorlike mass was seen protruding about 1 mm. behind the posterior surface of the iris into the posterior chamber. It was circumscribed and no blood vessels were seen coursing over its surface. The mass was barely translucent and was tremulous. The field was normal. No synechiae were present and the tension varied around 30.

In the left eye, pigmented deposits were seen on the posterior surface of the cornea. The anterior chamber was normal in depth. The pupil reacted sluggishly to light. On the posterior part of the globe at the ciliary region there was a large bluish-grey mass, 8 mm. in diameter, which was translucent and had the appearance of a ciliary staphyloma. The tension varied around 60. The field showed one small area of light perception. The optic disc was not cupped. The x-ray report showed no metastatic foci in the thorax nor destructive changes in either orbit. The blood Wassermann was two plus, nonprotein nitrogen 31, and the blood sugar 60. The blood count and the urine analysis were normal.

As the mass in the right eye was discovered while making a routine examination and as it could not be seen through the undilated pupil, it was deemed advisable to watch it to see if it increased in size. The left, since it had only a small area of light perception and was painful, was enucleated.

The case was under observation about six weeks. At first, the mass in the right eye could be seen only through the dilated pupil. Later it was just visible at the edge of the undilated pupil and as the patient had only one eye and as the cyst was increasing in size, it was imperative that some operative procedure be performed. On May 4, 1932, a broad iridectomy which included the cyst was performed by Dr. W. W. Weeks, vitreous presenting at the time. It was noticed a week later that the lens was becoming cataractous. Vision at this time was 20/50 with a +3.00 cyl. axis 150°. A month later the vision was 20/200 and the tension 45 Schiötz. It was deemed advisable to perform a needling. This was done by Dr. Weeks. Two weeks later the lens was swollen, and the tension was 44, so a linear extraction was done. Two weeks later a discission was performed with vision of 20/60 resulting.

The pathological report of Dr. Symmers was, cyst of the uveal layer of the iris.

The eye has been under observation until the present time. The vision of 20/60 has been maintained and the tension has averaged 36.

After a search of the literature, thirty-eight cases were found. Of these, twenty were spontaneous in origin, four were caused by trauma, and fourteen followed diseases of the eye.

As to the treatment of the reported cases, in each of six, a clinical diagnosis of cyst was made and an iridectomy performed; namely in those of Collins, Bickerton and Clark, Fischer, Bliedung, Braunstein, and Weeks. Results in these cases were satisfactory. The clinical diagnosis of cyst was made but no operative procedure performed by Zimmerman, Mayou, Worth, Marbourg, Lindenmayer, Weissman, and Granström.

The diagnosis of malignant tumor was made and the eye was enucleated in the cases reported by Schieck, Wintersteiner, Pagenstecher, Stephenson,

Remky, and Roth and Geiger[34]. The diagnosis was suspected by Collins.

In Wilmer's case there was a secondary glaucoma and he performed a trephination.

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Bibliography

[1] Jones, Wharton. Case of a cyst filled with watery fluid projecting into the anterior chamber of the eye. Lancet, 1852, p. 269.

[2] Bosteels. Observation d'un kyste de l'iris. Ann. Soc. de med. d'Anvers, 1864, v. 25, p. 425.

[3] Hulke, J. M. Report on case of cyst of the iris. Roy. Lond. Ophth. Hosp. Rep., 1869, v. 6, p. 12.

[4] Greeff, R. Zur Kenntnis der intraoculären Cysten. Arch. f. Augenh., 1892, v. 25, p. 395.

[5] Collins, T. On the pathology of intraocular cysts. Roy. Lond. Ophth. Hosp. Rep., 1893, v. 13, p. 41.

[6] Eales and Sinclair, W. W. Uveal cyst of the iris. Trans. Ophth. Soc. U. Kingdom, 1896, v. 16, p. 56.

[7] Zimmerman. Case of bilateral pigmental tumors probably cysts of the ciliary bodies. Ophth. Rev., 1897, v. 16, p. 129.

[8] Jackson, E. Pseudo tumors of the uveal tract. Amer. Jour. Ophth., 1920, v. 3, p. 397.

[9] Schieck, F. Ueber pigmentierte Zysten an der Irishinterfläche. Klin. Monatsbl. f. Augenh., 1904, v. 23, p. 321.

[10] Rabitsch. Ein Beitrag zur Kenntnis der intraepithelien Uvealcysten. Centralbl. f. prakt. Augenh., 1904, v. 28, p. 321.

[11] Mayou. Cyst of the pigment epithelium of the iris. Trans. Ophth. Soc. U. Kingdom, 1905, v. 25, p. 86.

[12] Wintersteiner. Ueber idiopathische Pigmentzysten der Iris. Klin. Monatsbl. f. Augenh., 1906, v. 44, p. 297.

[13] Bickerton and Clark. Cyst of iris. Trans. Ophth. Soc. U. Kingdom, 1907, v. 27, p. 83.

[14] Coats, G. An unusual form of cyst of the iris. Roy. Lond. Ophth. Hosp. Rep., 1908, v. 17, p. 143.

[15] Ichikawa. Ueber eine der amaurotischen familiären Idiotie verwandte Krankheit mit histologischer Beschreibung, etc., Klin. Monatsbl. f. Augenh. 1909, v. 47, p. 73.

[16] Pagenstecher, A. H. Multiple Cysten an der Irishinterfläche und am Corpus ciliare. Arch. f. Ophth., 1910, v. 74, p. 290.

[17] Worth. Cyst of the pigment epithelium of the iris. Roy. Lond. Ophth. Hosp. Rep., 1910, v. 18, p. 52.

[18] Gilbert. Ueber Zysten und Geschwulstbildungen des Pigmentepithels der Iris. Klin. Monatsbl. f. Augenh., 1910, v. 48, p. 149.

[19] Weeks, J. E. A case of symmetrical occlusion of the pupils by development of cysts and small solid masses from the uveal layers of the iris. Arch. of Ophth., 1914, v. 48, p. 483.

[20] Stephenson, S. A cyst of the pigment epithelium of the iris. Trans. Ophth. Soc. U. Kingdom, 1916, v. 36, p. 270.

[21] Rados, A. Ueber spontane Iriscysten und traumatische Scleralcysten. Arch. f. Ophth., 1919, v. 99, p. 152.

[22] Fischer, M. A. Ein neuer Fall von einer spontanen pigmentierten Cyste der Irishinterfläche. Klin. Monatsbl. f. Augenh., 1920, v. 65, p. 876.

[23] Bliedung, C. Eine spontane intraepitheliale Iriszyste. Klin. Monatsbl. f. Augenh., 1921, v. 67, p. 401.

[24] Vogt, A. Zystenbildung des Pupillarpigmentsaumes. Klin. Monatsbl. f. Augenh., 1921, v. 67, p. 330.

[25] Remky, E. Spontane Zysten der Irishinterfläche und des Corpus ciliare. Klin. Monatsbl. f. Augenh., 1923, v. 70, p. 347.

[26] Braunstein, E. Multiple spontane pigmentierte Cysten der Irishinterfläche. Arch. f. Ophth., 1924-25, v. 115, p. 381.

[27] Marbourg, E. M. Pigment cyst of the iris. Amer. Jour. Ophth., 1925, v. 8, p. 147.

[28] Weissman. Zur Klinik der Irisgeschwülste. Klin. Monatsbl. f. Augenh., 1927, v. 79, p. 649.

[29] Lindenmayer. Klin. Monatsbl. f. Augenh., 1927, v. 79, p. 650.

[30] Wilmer, W. W. Cyst of the uveal layer of the iris at the pupillary margin in a case of posterior synechiae with secondary glaucoma. Arch. of Ophth., 1929, v. 1, p. 162.

[31] Granström. Contribution à l'étude des kystes spontanés issus de la face postériure de l'iris. Acta Ophth., 1930, v. 8, p. 35.

[32] Terrier. Arch. d'Opht., 1901, v. 21, p. 651.

[33] Mann, Ida C. The development of the human eye. Cambridge University Press, London, 1928.

[34] Roth, J. H. and Geiger, C. W. Posterior chamber cysts of the iris. Amer. Jour. Ophth., 1925, v. 8, p. 870.

GROWTH OF CORNEAL EPITHELIUM INTO ANTERIOR CHAMBER

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After preliminary iridectomy and cataract extraction without the dissection of a conjunctival flap, the intraocular tension rose and pain could not be relieved. Microscopic section of the enucleated eye showed the anterior chamber lined with corneal epithelial cells. From the pathological laboratory of the Manhattan Eye, Ear and Throat Hospital.

After corneal section by the Graefe knife for cataract extraction, healing of the corneal wound consists first in the production of a fibrinous coagulum between the two surfaces of the incised cornea and their coaptation, with gaping of the anterior and posterior edges of the wound. In other words, the two stroma surfaces are brought closely together but the anterior border, consisting of epithelium and Bowman's membrane, and the posterior border, consisting of endothelium and Descemet's membrane, are not coaptated. This permits the aqueous to seep into the corneal stroma until the endothelium has regenerated across the fibrinous coagulum that fills the gap, in this way closing off the anterior chamber from the cornea proper. The corneal epithelium, however, not only bridges across the anterior gap but also grows down into the wound proper until it is met by the fibrous tissue growing between the two lips of the corneal wound where the two stroma surfaces are uniting. As this fibrous tissue pushes forward, it gradually flattens out the ingrowing corneal epithelial plug and a smooth layer of corneal epithelium finally covers the wound. Posteriorly, the fibrous tissue grows down to the endothelial layer of cells and only several months later is a new Descemet's membrane laid down or secreted by the endothelium; Bowman's membrane, however, is not reformed.

It sometimes happens that the original coaptation of the lips of the corneal wound is not firm; accordingly, the corneal epithelium, instead of being stopped by the fibrous plug of tissue, continues to grow straight through into the anterior chamber lining the anterior surface of the iris, the filtration angle, and finally, even the posterior surface of the cornea, thus forming a cyst of the anterior chamber. The presence of corneal epithelium on the anterior surface of the iris and at the filtration angle sets up glaucoma which usually necessitates enucleation. This complication is not uncommon and has received the attention of Fuchs, Elschnig, Meller, Speciale-Cirincione, Saito, Morax and Duverger, and others. All are agreed as to its histogenesis and feel that such eyes usually come to enucleation.

According to Treacher Collins, however, if a conjunctival flap is used in cataract extraction to cover the corneal wound, then, instead of a plug of corneal epithelium growing down into the wound, the subepithelial vascular tissue of the conjunctiva fills the gap and thus removes the possibility of the corneal epithelium's proliferating into the anterior chamber with destructive results.

The condition may not manifest itself clinically for several months after the cataract extraction and good vision may already have been obtained by the surgeon who is congratulating himself on having attained a good result. Then glaucoma with all its attendant symptoms sets in and a trephine or other drainage operation is done with no relief of pain; finally the eye is enucleated. The presence of corneal epithelium in the anterior chamber is not diagnosed clinically and the true nature of the condition is discovered only when sections of the eye are examined microscopically.

Of course, traumatic wounds of the cornea are even more prone to this complication than surgical wounds, because in the latter the incision is straight, clean-cut, and regular and the edges are replaced by the surgeon. In traumatic wounds which are seen soon after the injury, almost invariably a conjunctival

flap is made to cover the incised area and in this way the ingrowth of the corneal epithelium is prevented. Cases in which no flap is made or which are seen too late to warrant this procedure, not uncommonly result in epithelial proliferation into the anterior chamber with resultant glaucoma and eventual enucleation.

Case report

E. V., a male, fifty-seven years old, had had a preliminary iridectomy done for mature senile cataract of the right eye six weeks prior to the lens extraction, which was done without dissecting a conjunctival flap. The removal of the cataract was entirely uneventful and at the first dressing, forty-eight hours later, no unusual findings were noted by the surgeon. The anterior chamber had reformed, the iris pillars were in place and only a small amount of soft lens matter was present. The eye continued to be red and healing progressed very slowly. A week after the extraction, there was severe pain in the eye and the injection increased as the intraocular tension rose. Miotics were used to no avail and finally, six days later, a trephining operation was performed.

Fig. 1 (Levine). Plug of corneal epithelium growing in towards the anterior chamber.

There was moderate relief of pain for two days but then the injection and discomfort were even more marked and, inasmuch as no improvement could be obtained, the eye was enucleated for relief of pain.

Fig. 2 (Levine). Layer of corneal epithelium lining the anterior surface of the iris.

Fig. 3 (Levine). Figure 2 under higher magnification.

Pathological Examination.—At the corneal limbus, a plug of corneal epithelium grows in the line of incision to-

wards the anterior chamber (fig. 1). The anterior surface of the iris is lined with a layer of corneal epithelial cells in their typical stratified arrangement, the epithelial ingrowth consisting of cylindrical basal cells and flat outer cells (figs. 2 and 3). No corneal epithelium is present on the posterior surface of the cornea nor on the posterior surface of the iris. (In Elschnig's case the latter did occur so that both the posterior chamber and the anterior chamber were lined by corneal epithelium.)

Conclusions

1. In operations for cataract extraction, it is advisable to dissect a conjunctival flap with which to cover the section.

2. Penetrating wounds of the cornea, regardless of iris prolapse, should always be covered by a conjunctival flap.

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References

Collins, E. T. Postoperative complications of cataract extraction. Trans. Ophth. Soc. U. Kingdom, 1914, v. 34, p. 18. Ophthalmoscope, 1914, v. 12, p. 422.

——— and Richardson Cross. Two cases of epithelial implantation cyst in the anterior chamber after extraction of cataract. Trans. Ophth. Soc. U. Kingdom, 1892, v. 12, p. 175.

Elschnig. Epithelauskleidung der Vorder- und Hinterkammer als Ursache von Glaukom nach Staaroperation. Klin. Monatsbl. f. Augenh., 1903, v. 41, p. 247.

Fuchs. Atlas of histo-pathology of the eye. v. 2, no. 2, pl. 26.

Meller. Ueber Epitheleinsenkung und Cystenbildung im Auge. Arch. f. Ophth., 1901, v. 52, p. 436.

Morax, V., and Duverger. Sequels of penetrating wounds of cornea; Epithelial invasion of anterior chamber. Ann d'Ocul., 1909, v. 141, pp. 1-27.

Saito. Histogenesis of traumatic iris cyst. Klin. Monatsbl. f. Augenh., 1915, v. 54, p. 534.

Speciale-Cirincione. Glaucoma caused by epithelial lining of anterior chamber after cataract operation. Societa Italiana di Oftalmologia. Atti del Congresso d'oftalmologia, 1924, p. 180-181.

CEREBRAL PSEUDOTUMORS OR CHRONIC ARACHNOIDITIS

Report of three cases

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The three cases reported illustrate the difficulties in making the differential diagnosis, but each conformed in some respects to previous findings in this affection. Choked disc was present in all: in one case this entirely subsided after operation; in the second operation came too late to restore good vision, and in the third, operation being disallowed, failing vision progressed to total blindness. Read at the meeting of the Eastern New York Eye, Ear, Nose and Throat Association, April, 1933.

"Conditions that simulate brain tumors so closely as to be mistaken for them, are by no means rare[5]," and have been termed pseudotumors by several neurosurgeons.

Etiology: The condition appears in many cases to be definitely a direct sequela of a meningoencephalitis, leaving more or less circumscribed adhesions of the arachnoid to pia mater and adjacent brain cells, with retention of varying amounts of cerebrospinal fluid in the basilar and posterior cisternae. The condition occurs most frequently in the young, from the ages of six to thirty-five years; some cases are reported to have occurred as early as in the third year of life, and others after the fiftieth. Many patients give a history of head injury, or some infection, as influenza, purulent otitis media, and other acute infectious diseases.

Charles H. Frazier says that in his opinion "infections of the tonsils in some cases have caused chronic arachnoiditis[6]." Of the above causes middle-ear infections are probably the most frequent; this is so apparent that Horrax has made a classification of those cases whose etiology is thought to be of otitic origin[5].

General symptoms: Sudden headaches, either frontal or occipital, frequently occurring in the morning, may be the first symptom; these headaches recur with increasing frequency, associated with nystagmus, vertigo and vomiting. "When infection is limited to the basal cistern, there is little or no headache, after the initial invasion[8]."

Ataxia of any or all extremities may be present; reflexes may be exaggerated or abolished. Sometimes patients complain of burning pain or numbness of the arms or legs; hyperesthesia of the skin is common. Weakness of the facial muscles has often occurred. Pain in the back of the neck is very frequent. These symptoms may be fleeting, and remissions are common. Not infrequently, patients put on weight rapidly, and in girls there may be suppressed or irregular menses. Localized acromegaly is not infrequent. In acute arachnoiditis there are febrile symptoms.

Disturbances of the central nervous system and special senses: Attacks of unconsciousness sometimes occur; the sense of smell may be disturbed; tinnitus of one or both ears is often an early symptom, and there may be loss of hearing, usually unilateral. This may explain some cases of nerve deafness. Blurred vision is more constant than in cases of cerebral tumor or abscess.

Double vision is often present, due according to Cushing to "jamming of the brain stem down into the foramen magnum, stretching the sixth nerve against the anterior spinal arteries[13]." There is rapid failure, and total loss of vision in progressive cases. In cerebral tumors, choking of the disc is absent in from twenty to thirty percent of the cases, and is never as great as occurs in chronic arachnoiditis.

The optic chiasm and pituitary body form part of the floor of the third ventricle. Blocking the cerebrospinal fluid gives rise to internal hydrocephalus, with injury to the optic chiasm and hypophyseal disfunction.

Undoubtedly, there are abortive cases in which complete recovery takes place, without serious symptoms ever being manifest.

Pathology: As found at operation, the dura is very tense, and there is a marked thickening of the arachnoid with adhesions, causing a walling-off and retention of cerebrospinal fluid, sometimes called arachnoid cysts. This occurs most frequently in the posterior and basilar cisternae. It is this blocking of cerebrospinal fluid that causes the nearly universal choking of the discs.

On lifting the cerebrum, exudates and adhesions may be found, involving the chiasm and optic nerves. The cerebrospinal fluid is usually negative, except for the occasional presence of albumen.

In many cases, previously diagnosed as intracranial tumor, the most careful autopsy has revealed nothing but a thickened arachnoid with retained cerebrospinal fluid.

Diagnosis: "The symptoms are so nearly like those of cerebral tumor that the diagnosis can rarely, if ever, be made with certainty, until at time of operation[6]."

There are, however, a few helpful diagnostic points. Localized symptoms may never appear; in any event they are preceded by general intracranial pressure. The symptoms are fleeting and long remissions may occur. This condition has, at times, led to an erroneous diagnosis of hysteria or neurasthenia. The choking of the disc is marked. Some cases are reported as having from seven-to-eight-diopter elevations. The field of vision is not cut off sharply, as in hypophyseal tumor, but only a moderate concentric contraction occurs. A negative x-ray of the skull, and a negative Wassermann, when present, would support our suspicion of chronic arachnoiditis.

Treatment: Having increased intracranial pressure, with either cerebral tumor or chronic arachnoiditis, early operation is imperative in order to save the sight. The operation consists in exposing the base of the brain, either subtemporally, suboccipitally, or transfrontally; retained fluids are liberated and adhesions broken up. Time should not be lost on a theory of some vague toxic condition. In cases that have little intracranial pressure, less radical treatment may be tried, but no temporizing treatment should allow a progressive case to go on to blindness.

Prognosis: This is surprisingly good in cases submitted to surgery, when the pathology is considered. One would expect reaccumulation of the fluid and adhesions, but recurrences are rare. In many cases there is immediate and rapid improvement in the vision after operation. Obviously when operation is delayed until there is permanent injury to the optic nerve, recovery of vision cannot be expected. "Subarachnoiditis is curable surgically as long as the infection is limited to the basal cistern[8]."

Charles H. Frazier says: "In my series of twenty-two cases, nineteen patients are alive after periods varying from one to twenty years. Three have died, one immediately following a subtemporal decompression. I have in no instance been called on to operate a second time. Apparently, relief from pressure suffices, although one wonders why there should not be more recurrences[6]."

Gilbert Horrax reports on operations in thirty-three cases with two deaths within a few days; in three others the patient died within from seven months to two years; twenty-eight of the thirty-three patients are well or improved, after an interval of from one to nine years. Other writers have reported series of operations with less favorable results. There are, occasionally, cerebral hernias following operation, which prolong the convalescence.

Case reports

Case 1. Miss N. H., aged 20 years, was seen first July 15, 1932, and gave a history of blurred double vision for the last three weeks, converged left eye, frontal headaches shifting to occipital; dizziness, and soreness at the back of the neck and extending down the right arm. Vision of the right eye with correction was 20/30—, left eye 20/60. There was choking of the discs, most marked in the left eye; the left pupil was larger than the right, both reacting to light and accommodation. The patient had gained thirty pounds in the past eight months. The patellar reflexes were absent. There were no mental disturb-

ances. Wassermann reaction and the urine were negative. In September, 1932, the patient entered the Peter Bent Brigham Hospital. Dr. Cutler performed a suboccipital operation under local anesthesia. Considerable cerebrospinal fluid, which was found enclosed in an adherent arachnoid, was released from the cerebellar fossa. No tumor was found. Diagnosis of chronic arachnoiditis was made by Dr. Cutler, and the patient returned home October 10.

On November 10, 1932, I saw the patient at my office. She was feeling well; vision of the right eye was 20/30, left 20/40; there were no diplopia, headaches, or dizziness. The discs were blurred, but much less than before operation. Reflexes were absent. The field of vision was moderately contracted. On February 20, 1933, vision in each eye was 20/30, with correction. She was having no dizziness nor ataxia, the patellar reflexes remained abolished. April 18, 1933, the vision of each eye was 20/30, with no choking of the discs, and muscle balance normal. The patient felt well, and had every appearance of perfect health.

Case 2. Miss C. G., aged 35 years, a teacher in the public schools, consulted Dr. Ralph E. Seeley, June 12, 1931, because of failing vision for the past six weeks. She was having frontal headaches, frequent vomiting, and vertigo. The gait was staggering, and slight ataxia was present. By August, two months later, vision was failing rapidly, the patient would often fall; as she expressed it, "she would just drop in her tracks." There were large areas of anesthesia, mostly on the left side. The sensitivity of the right cornea was diminished. The sense of smell was lost. The mind was sluggish, the discs were choked, and the field of vision was moderately contracted. Reflexes were active. Wassermann reaction and the urine were negative. Although the patient was urged to enter the hospital for a decompression operation, she spent the month of August under the care of a dentist, thinking her teeth might be the cause of her failing vision. When admitted on August 29, 1931, to the Peter Bent Brigham Hospital, the vision was reduced to counting of fingers at three feet in the right eye, and in the left to the perception of large objects. The color sense had been lost. On August 31, x-ray pictures of the skull were negative. Ventriculograms showed dilated, but not displaced ventricles. No localizing signs of tumor were present. With the patient under local anesthesia, a suboccipital decompression was performed by Dr. Horrax, liberating retained cerebrospinal fluids. No tumor was found.

Ten days after operation, the vision had improved, so that she recognized roses that had been brought to her. She made a rapid recovery and left the hospital in three weeks. Since the operation, she has had no recurrences of headaches, vomiting, or vertigo, and the sense of smell has returned. She can now read headlines with the right eye, and count fingers at four feet with the left eye. The field of vision is nearly normal. The right disc is pale, and the left has the appearance of total atrophy. The patient is well nourished and, aside from her poor vision, enjoys her former health. It is now eighteen months since the operation, and inasmuch as no localizing symptoms have developed, a tumor may be excluded. Had this patient been operated on two months earlier, it is probable much more vision would have been saved.

Case 3. E. I., a girl, aged 10 years, was brought to the Rutland Hospital, August 18, 1930, suffering from acute febrile symptoms resembling cerebrospinal meningitis, but without rigidity. She soon developed marked endocarditis, was dizzy, and had occipital headaches, with occasional vomiting. There was an inability to void. The skin and flesh were very sensitive. Wassermann reaction and the urine were negative. On September 2, the attending nurse reported loss of vision with sudden onset. The pupils were dilated, the discs choked. After a tedious convalescence, the patient improved in every way except as to vision. In six months she could get about the house, and later was able to do things common to children, but the vision did not return. The discs

became totally atrophied, and light perception was lost.

At Cushing's clinic, three months later, after an exhaustive examination, including ventriculograms, that showed dilated but not displaced ventricles, a tentative diagnosis of cerebellar tumor with internal hydrocephalus, or chronic arachnoiditis, was made. No operation was advised. Today, this child attends school, and appears to be normal, except for loss of vision. Her disposition is cheerful, whereas she was a fretful child before her sickness. With her mother's aid, she has no difficulty in her school work. Cerebral tumor may be eliminated, as it is now three years since her sickness, and no localizing symptoms have appeared. If in this case, operation had been performed early, it is presumable that useful vision might have been retained.

Conclusion: Prompt recognition of and operation in cases of chronic arachnoiditis, may save the vision and restore to health patients otherwise doomed to blindness and invalidism.

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Bibliography

[1] Heuer, C. J., and Vail, D. T., Jr. Chronic cisternal arachnoiditis producing symptoms of involvement of optic nerves and chiasm; pathology and results of operative treatment in four cases. Arch. of Ophth., 1931, March, v. 5, pp. 334-349.
[2] Craig, W. McK. Chronic cystic arachnoiditis. Amer. Jour. Surg., 1932, September, v. 17, pp. 384-388.
[3] Craig, W. McK., and Lillie, W. I. Chiasmal syndrome produced by chronic local arachnoiditis. Arch. of Ophth., 1931, April, v. 5, pp. 558-574.
[4] Spurling, R.G. Chronic cystic arachnoiditis, clinical study. South. Med. Jour., 1928, October, v. 10, pp. 804-811.
[5] Horrax, G. Generalized cisternal arachnoiditis simulating cerebellar tumor, its surgical treatment and end-results. Arch. Surg., 1924, July, pp. 95-112.
[6] Frazier, C. Cerebral pseudotumors. Arch. Neurol. and Psychiat., 1930, December, v. 24, pp. 1117-1132.
[7] Slough, J. D. Choking of the optic disk, other than tumor of the brain. Arch. of Ophth., 1932, December, v. 6, pp. 821-830.
[8] Eagleton, W. P. Suppurative meningitis of otitic and nasal origin, its relation to blood stream invasion of the pial vessels. Arch. Otolaryng., 1932, June, v. 15, pp. 885-905.
[9] Lillie, W. I. Ocular phenomena in cases of chiasmal lesions. Surg. Clinic of No. Amer., 1921, v. 1, p. 1363.
[10] Stookey, B. Adhesive spinal arachnoiditis simulating spinal cord tumor. Arch. Neurol. and Psychiat., 1927, February, v. 17, pp. 151-178.
[11] Young, W. W. Case of adhesive spinal arachnoiditis simulating spinal cord tumor. Jour. Nerv. and Ment. Dis., 1928, July, pp. 11-16.
[12] Cushing, Harvey. Brain, 1910, October, v. 33, p. 204.
[13] Pousepp, L. Surgical intervention in four cases of myelitis compression caused by osseous deposits in arachnoidea of spinal cord (arachnoiditis ossifications). Jour. Nerv. and Ment. Dis., 1931, January, pp. 1-191.

A POSSIBLE EXPLANATION OF ONE TYPE OF COLOR BLINDNESS

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The eye that is color blind for green is represented as having four times the number of blue-receptor cones as of either green or red, but both the green and the red cones are each equal in size to two of the blue. The receptor for green cannot be stimulated by green light, but is stimulated by red light. This hypothesis, in the writer's opinion, meets the requirements of the problem better than Fick's hypothesis. From the Department of Psychology, Ohio State University.

One type of color blindness which has provoked extended discussion and in the attempted explanation of which several hypotheses have been made is worthy of brief consideration. In this type the eye shows color blindness for green and at the same time reacts with normal visual acuity when stimulated by white light. When, on the other hand, it is stimulated with wave lengths from the red portion of the spectrum, a yellowish hue is perceived. Its characteristic color responses are these:

(1) Normal visual acuity in response to white light.

(2) Perception of yellow when stimulated by the red-region wave lengths.

(3) No response to the wave lengths of the green interval.

(4) Very slightly enhanced visual acuity upon stimulation by the red-region wave lengths.

(5) A very great enhancement of visual acuity in response to stimulation by the wave lengths of the blue region.

This type of eye was discussed by Fick[1] who formulated an explanation known as Fick's hypothesis. It postulates that the green receptors are not activated by the green-region wave lengths but are stimulated by those of the red region; and he further postulates that when these *green receptors* are stimulated by the wave lengths of the red region they release into the nerve conductor a discharge which is the same as that of the normal green. This hypothesis represents the retina as abnormal in one respect only; namely, in that the green receptors are not activated by the wave lengths that discharge them in the case of the normal eye. We may take the following figure (fig. 1) as diagrammatically representing the structure of the normal eye.

In our illustration we have depicted the normal eye as having three families of cones, two bulbs representing the actual number of cones in each family. We, in other words, assume that the cone families are divided into groups of equal magnitude. We assume that a blue liquid is contained in two of the bulbs, green liquid in two, and red liquid in the remaining two. The bulbs are all joined to tubes which pass, by more or less circuitous routes, to a central detector, the brain. Now these bulbs do not squeeze themselves; there must be an external force (in the form of light waves) which squeezes them, thereby forcing a discharge of their loads into the nerves. This agent is represented in the illustration by the symbol, ~. In the type of degenerate eye under discussion we have indicated that the wave lengths of the green family are not capable of squeezing any retinal bulbs and that the wave lengths of the red family are capable of squeezing both the green-family cones and the red-family cones.

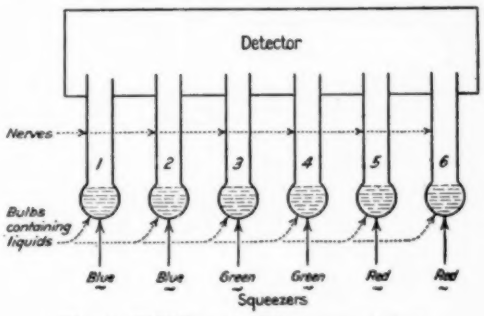

Fig. 1 (Williams). The normal eye.

Fick's hypothesis as to both the nature and the extent of the abnormality of the eye in this particular form of color blindness is represented diagrammatically in figure 2.

In bulbs (1) and (2) we assume a

blue liquid, in (3) and (4) a green liquid, and in (5) and (6) a red liquid. Where the line reaches from the respective wave lengths (our squeezers) to the bulbs the indication is that these wave lengths are effective squeezers. Where the lines do not reach the squeezers we have a pictorial representation of the fact that these wave lengths cannot effectively squeeze or cause these cones to discharge their loads into the nerves that lead to the detector. In the case of the red-region wave lengths, we use lines passing to both the green- and the red-cone families. This latter is necessitated by the fact that the brain does not report that

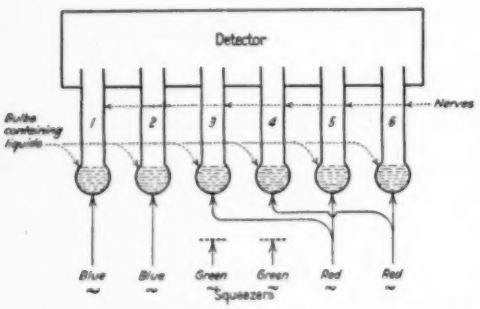

Fig. 2 (Williams). Fick's interpretation of the retinal abnormality.

it sees red but does report that it detects yellow.

Let us now examine the Fick hypothesis with a view to testing its adequacy as a description of the degenerate eye of the type mentioned above.

(1) The subject having such an eye is shown by experiment to possess normal visual acuity when stimulated by white light. To say that he has normal acuity is but a way of saying that he can detect as great a body of details in the stimulating object as a normal person can. Also since the acuity of any eye is proportional to the number of functioning rods and cones in the retina, it must follow that the type of eye here under consideration possesses as many functioning cones as does the normal eye. Fick's hypothesis, therefore, adequately accounts for the experimentally verifiable fact that this type of eye possesses a visual acuity equal to that possessed by the normal eye.

(2) Fick's hypothesis serves admirably to explain the fact that when this degenerate eye is stimulated by the waves of the red-wave-length family, the subject sees a yellow and not a red hue. Since the red-wave-length squeezer, in this case, discharges both the red and the green cones, the brain detects a synthesized quality; namely, yellow. This is the only thing that could result on the basis of the tri-receptor theory. On this point, then, Fick's hypothesis is eminently satisfactory.

(3) The fact that when stimulated with light waves of the green family, the subject sees nothing at all is but another way of stating one feature of the type of eye we are now discussing. Therefore, Fick's theory serves to explain this aspect of the case.

The abnormality that Fick postulated in this type of color blindness was to the effect that there is some sort of surface peculiarity appertaining to the green cones whereby they are not stimulable by the wave lengths which normally stimulate them.

In attempting to explain the two remaining aspects of the type of color blindness exhibited by the eye under consideration, the hypothesis of Fick breaks down completely. Let us undertake to show this and also to suggest a hypothesis which will suffice at the very points where Fick's hypothesis breaks down.

(4) In the case suggested, when the eye was stimulated by the long wave length of the red family, it was found that acuity was only very slightly increased—indeed it was just about normal. Each time that this eye was stimulated by red light—if it had not been just previously acted upon in a way conducive to modifying both the character and magnitude of its response—it gave what was, within the limits of experimental error, a normal response.

On Fick's theory the stimulation by red light should have doubled the acuity of the normal eye for red light. Since in this case the red wave length stimulates both the green family of cones and the red family at the same time, the

subject should have his acuity for yellow doubled. Here, as elsewhere, the assumption is that acuity is proportional to the number of functioning cones and as this red-wave-length family releases both the green and red cones we have twice as many cones discharged by the red in this eye as in the normal eye. We should therefore have a very greatly enhanced acuity when so stimulated. This enhancement was not experienced; therefore, there is something wrong with Fick's theory.

(5) The last observation made was that a very decided augmentation took place when this eye was stimulated by blue light; which appears to be paradoxical. Stimulation by red wave lengths releases two families of cones, as is attested by the fact that the subject sees yelow color when he is so stimulated. Further, in white light he shows normal visual acuity.

Since his acuity in white light is normal we must say that he has only the normal "over-all" number of cones. If in white light he displayed an augmented acuity it would be necessary to assume an extraordinary number of cones. Here we have, therefore, two characteristics that seem to be inseparable: normal acuity in white light, coupled with decided enhancement of blue sensation, and also with the perception of yellow when the eye is stimulated by the red wave lengths. This situation is baffling for Fick's theory fails to explain the fact that stimulation of this eye by red light does not effect an increase in acuity over that of the normal eye and also that stimulation of this eye by blue light involves a very decided enhancement, while acuity in white light is normal.

Fick's hypothesis satisfactorily accounts for items (1), (2), and (3). It fails to explain items (4) and (5). What better hypothesis can be suggested? Fick saw that the structure of the eye, here in question, was abnormal. The eye cannot be acted upon by the green wave lengths, and yet the green family and the red family can both be acted upon or stimulated by the red-family wave lengths. Fick thought of some sort of surface abnormality, because of which the normal green squeezers could not cause the green-liquid-containing bulbs to discharge their loads into the nerves. We can get out of the difficulties that confronted Fick by a multiplication of the respects in which this eye is supposed to be abnormal.

Our hypothesis

Suppose we say that this degenerate eye is abnormal in that the blue-liquid-containing bulbs are abnormal in so far as that each one contains only one half of the amount of liquid that a normal blue cone contains; further that the number of these blue-liquid cones is twice as great in this degenerate eye as in the normal eye. Again let us postulate that the number of both the green cones and the red cones is exactly one half the number that holds in the case of the normal eye. These three postulates simply amount to assuming a greater variety of forms of abnormality than Fick assumed. Nature's forms of abnormality are not everywhere restricted to superficial or surface forms such as Fick demanded. Furthermore, our three demands are all such as are in accord with abnormalities found in abundance.

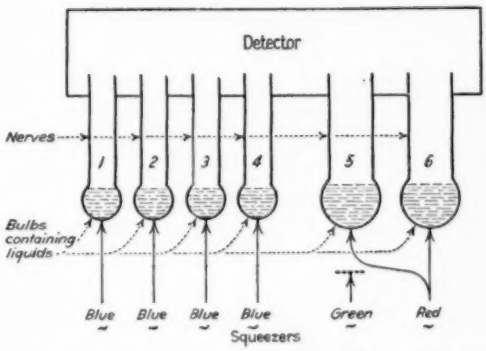

Fig. 3 (Williams). The retinal abnormality as the writer views it.

Figure 3 illustrates diagrammatically our hypothesis.

Let us see if this hypothesis will account for all of the facts manifested by the green-color-blind eye here under discussion.

(1) In the case of the *normal* eye we assumed three sets of tubes with two

tubes to each set, and as many receptors in each tube as there are in any other tube; i.e., we assume three equi-number groups of receptors. The stimulation of these three groups gives rise to the experience of a gray or white. According to figure 3 we shall produce the experience of white when the four blue bulbs, the one green and the one red bulb are squeezed. Since there are assumed to be as many green cones as red, and since in the four blue bulbs we postulate a number of these blue cones equal to twice the number of the green and of the red respectively, we can cause the experience of white only when they are all stimulated simultaneously. If the squeezers of the four blue bulbs and the one (red) squeezer which releases both red and green cones function simultaneously the brain gets stimuli which it interprets as white.

(2) The diagram shows that the red wave length is the squeezer that discharges both the green and the red cones. As a result of this, equal quantities of the green and red liquids are synthesized by the brain into the sensation yellow.

(3) As the diagram shows, the green wave length is ineffective. It does not squeeze the green liquid out of the green bulbs. We have represented this fact by a line that does not come into contact with the green cone. Thus we represent the failure of this eye to see green when stimulated by the green wave.

(4) The diagram shows that in this eye there are only two bulbs for both the green and the red liquids. In the case of the normal eye we assumed two bulbs for each color. In the present case we have only half that number, but since the red wave length releases both the green and the red bulbs, as many cones will be excited by the red light in this case as in the normal eye. Hence acuity in red light is the same here as in the case of the normal eye when stimulated by red light. It is thus that we can explain this fact of vision which Fick was unable to explain.

(5) When this degenerate eye was stimulated by the blue light it was found that visual acuity here was very decidedly augmented as against the acuity of the normal eye. On the basis of our picture, this is just what one would expect. Acuity being proportional to the number of functioning bulbs would certainly be greatly augmented in the case where the blue-liquid bulbs are twice as numerous as they are in the normal eye. Our figure shows four blue bulbs, one green, and one red one. Therefore, this representation embodies the experimental observation that acuity in blue light was greatly enhanced over the acuity of the normal eye.

Our hypothesis, therefore, embodies all the facts revealed through experiment upon this type of degenerate eye. This hypothesis simply goes beyond Fick's in laying down a much larger degree of abnormality in that it assumes a redistribution of the liquids in the bulbs, or, less figuratively, a redistribution of the charges of each cone of the blue family.

Reference

Fick, Eugen. Studien über Licht- und Farbenempfindung. Pflüger's Archiv, 1888, v. 44, p. 441.

NOTES, CASES, INSTRUMENTS

UNILATERAL EXOPHTHALMOS AND EPIDURAL ABSCESS*

EDWARD BELLAMY GRESSER, M.D.
NEW YORK

The following case report contains an unusual etiological factor in the production of exophthalmos, and a clinical picture so masked as to have led to an erroneous preoperative diagnosis.

A well nourished, healthy looking negress, 42 years of age, was admitted to Bellevue Hospital in October, 1932, complaining of protusion of the right eye and loss of its vision.

The familial history and past history were irrelevant to the present condition. She had had six full term pregnancies, no miscarriages, abortions or still births. Trauma to the orbital regions and head was decidedly denied. Of the local condition she claimed that the right eye during the past six months would periodically "swell" but would return to normal within a few days. No pains, headaches, fever or redness of the eye accompanied these episodes. About six weeks before hospitalization, the right eye became prominent and did not recede as formerly and during this period occasional retrobulbar pain was present.

On admission, the vision of the right eye was entirely gone, failure having commenced two weeks prior. No pain or headaches had been present for several weeks; nor fever at any time. The right eye was proptosed and the swollen lids could not be coapted. No pulsations of the globe nor bruits were detected. The conjunctivae were corrugated, dry, thickened and red. The cornea was flat, opaque, somewhat shrunken and contained a ring abscess. The anterior chamber was obliterated and the iris discolored, atrophic and adherent apparently to both lens and cornea.

The left eye was normal externally and internally with normal acuity and fields.

Pelvic examination showed no abnormalities. No suggestive pathology or signs were present in ears, nose, or throat. Neurological and general examinations were negative except for a diabetic state (urine, 3 plus sugar; 307 mgs.). The Wassermann test was negative (rechecked) and the Mantoux test 1 plus. Blood count showed R.B.C. 4,800,000; Hgb 92 percent; W.B.C.,

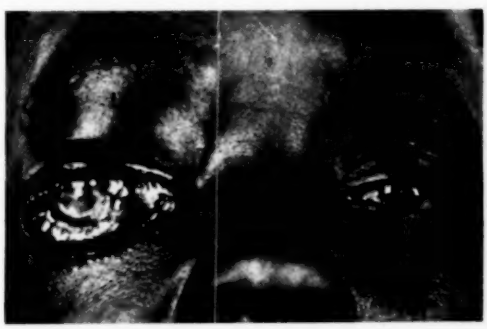

Fig. 1 (Gresser). Unilateral exophthalmos.

9,200: polymorphonuclears, 76 percent; lymphocytes 23 percent; eosinophiles 1 percent. The diabetes was easily controlled by diet and insulin.

X-ray study revealed the following facts; sella turcica normal with well formed clinoids; unusual thickening of the inner table of the vault in the frontal region, extensive destruction of the posterior portion, superior and inner walls of the right orbit and right ethmoid cells. Chest and long bones were normal. Dental survey showed no apical abscesses.

In consideration of the clinical history, appearance and laboratory data, preoperative diagnoses of retrobulbar neoplasm, secondary panopthalmitis from exposure and secondary erosion of the bony orbit were made. An exenteration of the orbit had been decided upon with the diathermo-coagulation knife but in passing through the orbito-palpebral fascia, a few drops of pus were encountered which predicated

* From the Ophthalmic Division (N. Y. University and Bellevue Hospital Medical College), Bellevue Hospital, New York City. Presented before the Eye Section, New York Academy of Medicine; Dec. 19, 1932.

the possibility of a retrobulbar abscess. The globe was then enucleated but no pus formation was found in the orbital tissues.

The roof periosteum was intact, bulging downward in the area of bone dehiscence and although not pulsating was under some tension. An incision through this periosteum allowed the escape of a comparatively great amount of green, non-smelling fluid which toward the end was expelled in pulsations. The frontal lobe of the brain with its covering could be discerned to be free from pus formation. A drain was inserted into the cavity and the postoperative recovery was uneventful without head pains, fever or neurological complications. The wounds healed within ten days.

Multiple bacteriological studies of the fluid revealed the staphylococcus aureus. Guinea pig inoculation was without effect. Turbid vitreous gave negative bacterial cultures.

Restudy of the case after recovery gave an additional point. A chronic otosclerotic process was thought to be visible in an x-ray plate but not confirmed by clinical otological examination.

Comment. The presence of a quiet epidural abscess was not diagnosed preoperatively. Its origin ultimately was not determined, though later x-ray films indicating a chronic mastoiditis is suggestive. The intracranial tumefaction caused erosion of the orbital roof with the production of exopthalmos and the panophthalmitis probably was of ectogenous origin during the period of exposure.

The clinical progress of an epidural abscess without fever, abnormal blood picture, neurological signs and negative past history lends interest to the etiology of exophthalmos.

39 Fifth Avenue.

SPONTANEOUS EXPULSION OF AN INTRAOCULAR FOREIGN BODY

T. Wassenaar, M.D.
PRETORIA, SOUTH AFRICA

As nothing similar could be traced in the available literature, the case which I wish to report here, must be very rare, if not unknown.

A European male, aged twenty years, was injured in May, 1931, by a flying splinter while hitting with a hammer on a cycle frame. The splinter struck the left eye, penetrated the cornea and could be seen lodged in the root of the iris on the temporal side, below the median line. The magnet was used, but with negative result: the foreign body showed no response whatever. An incision at the limbus was made over the foreign body. After the evacuation of the anterior chamber the foreign body could still vaguely be discerned. The magnet attachment was introduced into the anterior chamber, but still there was no response to the magnet. As the foreign body could not be grasped through the incision at the limbus, it was decided to postpone the operation. Since the eye seemed fairly peaceful the next and following days, and as the foreign body was thought to be enamel and not steel, the surgeon treating the case thought it wise to follow an expectant course. The slitlamp showed moderate iridocyclitis; this however gradually improved. After consultation with another eye-surgeon, it was definitely decided to abandon the idea of a second operation.

Recently, the father of the patient brought me a small black foreign body about 1.5 mm. long (see inset in fig. 1) which, he said, came out of his son's eye spontaneously. A reexamination of the patient convinced me that there could be no doubt with regard to this statement. A small brownish-red round spot on the sclera, at "5 o'clock" near the limbus, on the left eye, showed the mark of exit of the foreign body (see fig. 1). A more structureless, hyaline-like point in the centre of the red spot, indicated where the foreign body had actually penetrated through the sclera. The patient related that for about four days he could see the black foreign body in the red spot. It was gradually working its way out, and during the last two days the lower eyelid was frequently caught by it. The patient then decided to operate on himself. He seized and drew out the foreign body in the split end of a wooden match. The eye was none the

worse for its experience. There were still slight signs of the previous iridocyclitis. The media and fundus were clear and normal, tension of the eyeball good and the vision 6/4. A hole in the root of the iris (due to pressure atrophy) indicated where the foreign body had been lodged.

A further surprise was in store when the foreign body was tested at the magnet and found to be strongly magnetic. Why the magnet gave a negative result one and one-half years ago, will remain a mystery, unless it be taken for granted that the magnet was not in working order, although it was tested before the operation. It might, however, also be suggested that the point of the foreign body was fixed in the sclera from the inside. In view, however, of the fact that the foreign body was clearly visible in the root of the iris, one would have expected some response to the magnet.

The mechanism of this spontaneous expulsion, I suggest, finds its explanation in the movements of the iris. The continual play of contraction and dilatation of the pupil must have moved the foreign body to and fro and caused it to act like a hammer on the sclera, gradually wearing out the fibrous scleral tissue at the spot of contact. At the same time the iris tissue which came in contact with the foreign body became atrophied on account of pressure, thus ultimately leaving a hole in the iris in that area.

Fig. 1 (Wassenaar). The small round spot at "5 o'clock" on the left eye, shows the place of exist of the foreign body, which is shown in the inset in natural size. (Incidentally, the case also presents heterochromia).

Gresham Building.

SOCIETY PROCEEDINGS

Edited by Dr. H. Rommel Hildreth

CHICAGO OPHTHALMOLOGICAL SOCIETY

February 20, 1933

Dr. Michael Goldenburg, president

Simple evisceration of the globe versus simple enucleation

Dr. George P. Guibor said that strictly simple evisceration with preservation of the cornea was rarely discussed in the literature. In America the general custom in removing the mobile contents of the orbit was enucleation, with or without some form of implant in Tenon's capsule. The purpose of this paper was to create discussion concerning simple evisceration or exenteration by the method of Harold Gifford. The ocular contents were removed leaving the sclera and cornea intact. The cornea was saved and became the front of the stump. This was the most important part of the technic and distinguished what Gifford called "strictly simple evisceration" from other methods in which the cornea was sacrificed.

After comparing evisceration and enucleation the essayist's conclusions were: 1. That strictly simple evisceration was easier than simple enucleation. 2. That it produced a better cosmetic result, in that the stump was freely movable. 3. That less atrophy of the orbital contents occurred. 4. That it was the operation of choice in panophthalmitis. 5. That its one disadvantage was a moderate post-operative chemosis.

Discussion. Dr. Sanford Gifford said that there were certain cases in which an enucleation was necessary, where sympathetic ophthalmia was present, where tumor was suspected, or where the specimen was required for diagnosis. In a chronic traumatic iridocyclitis he would prefer enucleation to evisceration, but in fresh injuries which were seen immediately and where there had been no chance for sympathetic inflammation to develop, the chances were the same, and evisceration was preferable for cosmetic reasons.

Mr. Paul Gougelmann mentioned a new type reform eye which had been devised, similar in appearance to a shell. Almost all the air was taken out, there being about 1 mm. space between the front and back of the eye. When implants were too large there was a tendency to ptosis of the upper lid and the natural fold of the lid disappeared. Large implants resulted in a deep pocket under the lower lid and the eye dropped into this giving a tilted expression.

Simple eviscerations were gaining in favor. The result presented a flat or slightly convex appearance which always made a good cushion for a movable prosthesis. The upper lid did not lose its fold, as with large implants. The fullness of the lids was well maintained and the movement of the stump was equal to any implant.

An important factor was the length of time before the first prosthesis was inserted. Usually it was possible to fit it five or six days after operation, and too much could not be said in favor of early fitting of the first prosthesis. The stump formed naturally; the lids regained elasticity much earlier. Late fitting almost always resulted in shrinking of the lids.

Dr. William F. Moncreiff said it was generally agreed that in panophthalmitis we had an absolute indication for evisceration, while in malignant tumors we had an absolute indication for enucleation. The question of sympathetic ophthalmia with regard to evisceration was highly important, and we should distinguish clearly between the evisceration of a more or less recently traumatized eye, in which there might already be a sympathetic ophthalmia, and the evisceration of an eye which had not been traumatized and did not contain a tumor, as for example an eye blinded by absolute glaucoma, with no

previous operative procedure. In evisceratíng the second type of eye we could assure ourselves before operation that no sympathetic disease existed, and if we could be absolutely certain that all uveal tissue was removed from the tunica fibrosa, then we might also be sure that sympathetic ophthalmia might not follow the operation.

Certainly if a recently injured eye had an inflammation which was not a panophthalmitis, and some form of surgical removal was decided upon, there was no excuse for substituting evisceration for enucleation. Since the definite diagnosis of sympathetic ophthalmia was necessarily a histologic one, in any suspected case we were forced to enucleate the eye in order to make the diagnosis certain, for the histologic examination of the contents of an eviscerated bulb would be highly unsatisfactory as compared to that of an enucleated bulb. While the motility of the prosthesis was undoubtedly superior as a rule after evisceration, it should not be forgotten that motility was only one of the cosmetic features of the prosthesis, and that all of these cosmetic considerations were usually more important in the young than in the old.

Dr. M. L. Folk agreed with Dr. Moncreiff that we could not compare enucleation with evisceration, as they each had their indications, and it would seem to be a question of simple evisceration versus classical evisceration.

Use of calcium gluconate in diseases of the eye

Dr. Georgiana Theobald read a paper on this subject which will be published in this Journal.

Discussion. Dr. Russell Herrold said the use of calcium gluconate for uveitis as described by Dr. Theobald was interesting. He felt slightly responsible for this complication in a patient with a prostatic infection. It was not a gonococcus infection, but post-gonorrheal, as the specific infection happened several years previous to the eye complication, and the prostatitis. This individual had a neuritis, intermittent in type, localized, and of five years' duration. While every effort was made to be careful of the primary focus in the presence of a secondary infection, in this instance the eye complication followed a mild manipulation of the prostate. Having had a long experience with calcium gluconate, he suggested its use, and with permission of the ophthalmologist calcium gluconate was tried with satisfactory results. This case was reported with the hope that someone who had had experience with eye complications would find it of value.

Dr. Wm. F. Moncreiff said that during the past eighteen months, while engaged in the special study of more than fifty patients with acute attacks of endogenous iridocyclitis, he had employed calcium gluconate both intravenously and by mouth in a considerable number of cases, in addition to the intravenous injection of foreign protein and the well known local therapeutic measures directed to the eye itself. Despite the difficulty of evaluating a single therapeutic measure when several were being used simultaneously, his observations on these patients had convinced him that calcium gluconate, especially when used intravenously, was one of the most valuabe and important therapeutic resources available to us in the management of acute iridocyclitis. In those cases in which the exudate was predominantly fibrinoplastic rather than cellular, calcium gluconate appeared to be most effective.

Dr. Georgiana Theobald (closing) said all these patients were seen in the office. It was very simple to give calcium gluconate intramuscularly. It came in 10 c.c. ampules, and was injected between the scapulae in the back, one day on the right side and the next day on the left. There was absolutely no discomfort, and no patient, as yet, had complained of pain following the injection.

Suprasellar meningiomata and their routes of extension

Dr. Eric Oldberg said that meningiomas were tumors which arose from the arachnoid and consequently might develop anywhere within the cranial cavity. They were considered benign be-

cause they developed slowly and were usually circumscribed. This was not always the case however, since they were sometimes not circumscribed, and more important, they had a tendency to invade bone.

One of the sites of predilection for meningiomas, was the tuberculum sellae. They arose here from the meningeal covering of the tuberculum, and as they enlarged, they came eventually to impinge upon the optic nerves and the chiasm, giving rise to the characteristic syndrome of bitemporal hemianopsia, primary optic atrophy, with normal sella turcica, as described by Cushing and Eisenhardt in 1928. Meningiomas occurring in this region were nearly always spherical and well circumscribed, and they did not invade the bone to any great extent. For that reason, operations upon them were often attended by great success, both as far as restoration of vision, and chance against recurrence were concerned. That not all such "suprasellar meningiomas," were so favorable was illustrated by the following cases.

Case one was that of a young married woman of twenty-two years, who entered St. Luke's Hospital complaining of headache, a symptom of which she was suspicious because her father had died of a brain tumor. Examination showed slight pallor of the left disc, a tendency toward bitemporal hemianopsia to red, and a large hyperostosis as seen by x-ray, arising from the tuberculum sellae. Diagnosis of suprasellar meningioma was made, and the patient was operated upon. A large fungating growth, histologically meningioma, was disclosed invading the floor of the third ventricle, and extending all about the region of the sella turcica and chiasm, even passing out through the optic foramina with the optic nerves. The patient died seventeen days later, and at autopsy, the tumor was shown to have passed entirely through the floor of the skull, with extension into the sphenoid sinus.

The second case was that of a married woman of twenty years, who entered the Illinois Research and Educational Hospital with symptoms of multiple intracranial lesions, and signs of intracranial pressure. She was in extremis, and the first operation was merely decompression. Subsequently her hypertrophied and papillomatous left choroid plexus was removed. Eventually she died, and autopsy showed, in addition to numerous other meningiomata elsewhere, a large tumor springing from the tuberculum sellae, which invaded the entire sellar region including the optic foramina, and which extended through the sphenoid into the sphenoid sinus.

These cases were reported in order to show that on rare occasions, these usually extremely favorable tumors might be inoperable as far as permanent and complete removal was concerned. It was suggested as a precautionary measure that following extirpation of all such suprasellar growths, a portion of the tuberculum sellae be removed as well, if at all possible.

Discussion. Dr. Percival Bailey spoke briefly of a similar case. The patient was blind and had evidence of markedly increased intracranial tension. The localization was made by x-ray. In an attempt to make an x-ray of the optic foramen there was disclosed a thickening and elevation which was not visible in the usual antero-posterior view or lateral view; therefore an oblique view was made. An attempt was made to operate on this patient, in the manner described by Dr. Oldberg. In trying to tilt out the posterior fragment the anterior cerebral artery was torn. The tumor was a very large one. The diagnosis should have been made long before the stage in which the patient was first seen. At necropsy the point where the tumor was attached to the floor of the skull between the optic foramina, in front of the sella turcica, was seen. In a section cut through the whole region, the infiltration of the tumor into the bones could be seen. The typical whorls of tumor tissue were noted.

It happened that the cases reported tonight were very bad cases with the tumors extending into places where they usually did not extend, and the removal of such tumors was as impossible as it was for the ophthalmologist

to remove a glioma of the retina which had spread into the cranial cavity.

Dr. Eric Oldberg (closing) said in answer to Dr. Richard Gamble that so far as the first case was concerned, he did not see how an earlier diagnosis could have been made from ophthalmoscopic examination. Despite the fact that the tumor was large, the examination of the fundus of one eye showed nothing abnormal, while the other showed nothing but a small amount of pallor. Fields showed but a tendency toward bitemporal constriction to red alone.

A question was asked in regard to the taking of fields. In his experience adequate information could always be gained by the taking of form fields with suitable sized white test objects, on a tangent screen. He routinely used a distance of two meters, and test objects five, two, and one millimeter in diameter. If acuity was too greatly reduced, large objects could be used, and larger "bull's-eyes" where central scotomata were present. In special cases of greatly reduced vision, of course, it might be necessary to use the perimeter alone, and he had even seen a tendency toward homonymous hemianopsia demonstrated by means of a flash-light, in a patient with vision of only light perception.

Robert von der Heydt.

LOS ANGELES SOCIETY OF OPHTHALMOLOGY AND OTOLARYNGOLOGY

March 27, 1933

Dr. Dean Godwin, president

Paradoxical false image

Dr. Maxwell Fields read a paper on the subject which will be published in this Journal.

Progressive essential atrophy of the iris

Dr. Etta Jeancon stated that progressive essential atrophy of the iris was always unilateral, and of unknown etiology. Generally the first sign was a drawing of the pupil toward the limbus, causing it to become eccentric. This was followed by progressive thinning and atrophy of the iris stroma until actual holes appeared in the iris. The intraocular tension later rose, and loss of central vision occurred from secondary glaucoma.

After a review of cases previously reported in the literature Dr. Jeancon demonstrated the condition in the right eye of her patient, a woman thirty-five years of age. In this patient the left eye exhibited a congenital cataract, circumpapillary coloboma, and high error of refraction. This iris was uninvolved.

In the right eye the patient had noticed about six years before that the pupil was drawn downward and nasally. Two years ago Dr. Sloan of Charlotte, North Carolina, made the diagnosis of progressive essential atrophy of the iris, which was later corroborated by Dr. Zentmayer.

The patient was first seen by Dr. Jeancon one year ago at which time the right pupil was drawn way down in the lower nasal quadrant, and three large radial holes were present in the stretched iris opposite the pupil. Other small areas of atrophy of the stroma were noted over an intact pigment epithelium. The visual fields and acuity were unaffected although the tension was 55 mm. to 60 mm. (McLean). A general physical examination showed no foci of infection. In spite of the use of miotics the tension had been gradually increasing. The fields were still normal, although the disc was beginning to show some slight cupping.

Feingold's description of the histopathological picture and the various theories as to the cause of the iris atrophy were reviewed. It was stated that the theory of an underlying low-grade uveitis was no longer accepted. Dr. Jeancon favored the idea of Krieker as to the etiology of the atrophy. This assumed that the same biological process responsible for the absorption of the capsular and pupillary membrane in intrauterine life continued to be effective in after life, attacking the normal iris tissue and causing it to disappear. This meant that there must be an active absorption of iris tissue.

The glaucoma was thought to be caused by the lack of sufficient iris surface for restorption of the intraocular fluid, together with cellular blockage of the drainage angle of the anterior chamber.

In the majority of cases where operation had been done it had proved unsuccessful, although in two cases trephine operations and in one a Lagrange sclerotomy had proved effective in controlling the tension. In cases with high tension Dr. Jeancon would favor a drainage operation of the Elliot or Lagrange type as soon as the fields and central vision had begun to show diminution. In the patient presented where the effected eye was the only good eye the entire problem had been explained to the patient and the decision as to operation had been left to her judgment.

Discussion. Dr. Nesburn cited a case which he considered to be in the same category as essential primary atrophy of the iris. A woman, fifty-two years of age, gave a history of loss of vision in the right eye of four years' duration believed to be due to glaucoma. Six weeks ago the vision in the left eye became dim with an acute onset of glaucoma. The iris of the right eye was completely absent except for a small rim at the periphery which was adherent to the posterior surface of the cornea. No view of the fundus could be had on account of an opaque lens. The tension was 60 mm. (Schiötz). The left eye showed a clear cornea, a pupil oval in the vertical axis, and two posterior synechiae at "five and seven o'clock position." The iris had a latticed appearance due to atrophic spots. The tension was 38 mm. (Schiötz), controlled with miotics, and the vision was 20/30. Dr. Nesburn thought it probable that this was a case of secondary atrophy of the iris, but that the right eye might be at the final stage of what was an essential primary atrophy of the iris.

Dr. Eugene Lewis deplored the fact that we began by treating the tension in cases of glaucoma rather than going to the root of the matter by trying to find the cause of the tension. In recent studies made by him he had decided that hypertension was a problem of altered tissue chemistry. Osmotic pressure changes were due to altered permeability of the vascular walls and other biochemical changes. He had noted remarkable response to systemic measures which were aimed at altering the electrolyte concentration in the tissues. A plea was made for ophthalmologists to interest themselves in this problem.

Dr. Jeancon closed the discussion by agreeing with Dr. Lewis that a large field for research lay in the study of glaucoma along biochemical lines. A desire to see the case described by Dr. Nesburn was expressed because progressive essential atrophy of the iris was considered a unilateral condition. Posterior synechiae were not present in this disease. There might, however, be anterior synechiae between iris and cornea in the periphery.

Transparent skull

Dr. Theodore Lyster demonstrated from the ophthalmological standpoint a specimen of transparent skull belonging to Dr. Isaac Jones. He explained that the whole anterior half of a skull had been decalcified, cleared, and so mounted that by looking at it one obtained the effect of a stereoscopic x-ray picture. The larger sinuses were filled with gunmetal for purposes of orientation. This transparent skull showed clearly the orbital walls, and made one realize, (as was so well brought out by Dr. Carl Fisher), the great number of important structures which passed from the cranium at the apex of each orbit. To a medical man who happened to have only one eye, this skull would be of great value in visualizing the various structures in their normal relationship.

M. F. Weymann,
Recorder.

ROYAL SOCIETY OF MEDICINE, LONDON

Section on Ophthalmology

March 10, 1933

Mr. A. C. Hudson, president

Angiomatosis retinae

Mr. R. Foster Moore showed two cases of this condition. Both patients

were women, and both had a blind eye as a result of the condition. In the first patient's eye he placed three 4-millicurie seeds of radon as near the growth as possible. These seeds were left in situ for ten days. As a result, no angioma could be seen, the tumor being replaced by scar tissue. In the second case a much smaller dosage of seeds was used, namely, two seeds of 2-millicuries each, leaving them in place only three days. The operation was done only three weeks ago, and unless there was shortly a considerable alteration for the better he intended to use stronger seeds for a longer time. Perhaps this procedure would stop the progress of the angiomatosis.

Pituitary adenoma

Mr. R. Foster Moore also presented a case of this disease. The patient was a boy aged ten years, with the history that three weeks ago, while roller-skating, he fell and broke his right internal epicondyle, and a week before being seen he became blind in the right eye, which now seemed to be the seat of panophthalmitis, with a quantity of pus in the anterior chamber. In the fellow eye were a few petechial hemorrhages in the palpebral conjunctiva; he also had purpura. The exhibitor thought that the infection was metastatic; the white cell count was 12,000.

Retinoblastoma

Mr. R. Foster Moore said that a brother of this above patient had had double retinoblastoma, and both eyes were removed; subsequently the boy died. One eye had already been removed from the present patient, and sections of it had been prepared. In 1929, he came with a growth in the other eye. Mr. Moore put a radon seed in the eye on that date, and this had effected a cure. Certain changes could now be seen which were probably a sequel of the radium treatment, but the boy still attended school. When last seen his vision was 6/18. The mother had refused to have his second eye removed.

Familial macular degeneration

Mr. Humphrey Neame showed two cases of this condition. The patients, twins, were aged eleven years, and their vision was found to be defective by the school clinic officers. The father, aged forty-six years, was an out-patient at the same hospital some years ago, and the wife said that for three months he was so blind that he had to be led about. His sight afterwards recovered sufficiently to permit him to read, and he was able to do agricultural work. The father had not complained of his vision since then. In July last, both these children were said to have been of healthy appearance, and were bright and intelligent. Vision measured 3/60 with glasses, and the binocular fixation was good. There were delicate pigment changes in the maculae.

Cysts of the retina with cholesterin crystals

Mr. Humphrey Neame said that this woman, aged twenty-five years, had gradually failing vision of the left eye for the last four or five years. At the age of fourteen years her sight was good. There had been no injury to the eye, and no recent illness. In the left fundus were numerous brilliant iridescent crystals of flat appearance, widely distributed in the posterior part of the eye, and as deep as the retinal vessels. In the far temporal periphery two contiguous rounded prominences projected into the vitreous. These did not float after movement of the eyeball.

Ocular foreign body

Dr. T. H. Whittington showed a man aged fifty-nine years, with a piece of steel 23 mm. back from the center of the cornea. There was secondary glaucoma on the third day, so lens matter was evacuated. Later there was improvement, and no signs of disturbance were visible, except some spots, which looked like hemorrhages. Last December the patient complained of loss of sight in this eye, and distortion of objects in the center of the field. Widespread changes in this fundus were seen and the eye was blind. The other eye showed early macular changes.

Oxycephaly

Mr. Beard presented a patient, a Jew, aged thirty-four years, who since quite

early in life had been able to see only large objects. Some have supposed that oxycephaly was caused by premature synotosis of the sutures and Dr. Morley Fletcher had shown, by x-ray, a large pituitary fossa in such cases. The suggestion had been made that the optic atrophy in these cases should be alleviated by operating, to reduce the pressure.

(Reported by H. Dickinson).

COLORADO OPHTHALMOLOGICAL SOCIETY

January 21, 1933

Dr. W. T. Brinton presiding

Corneal ulcer with perforation

Dr. B. L. Adams presented H. L. W., a 64-year-old man, who had been first seen October 26, 1932, with the history that he had been struck in the right eye five days previously by a small piece of rock. He had complained of photophobia, epiphora, and poor vision in the right eye. He had had a burn of the eye 20 years previously.

On the first examination one could see a corneal ulcer, with the usual secondary inflammatory signs. The ulcer became serpiginous in type and a hypopyon developed. In spite of the use of many forms of treatment consisting of phenol, homatropin and atropin, hot fomentations, mercurochrome, dionin, iodoform, lacrimal sac and conjunctival irrigations, mercurophen, ultra-violet radiation, and electric cautery, the floor of the ulcer bulged and necessitated several paracenteses. The iris became adherent and could not be retracted even with subconjunctival injections of atropin, cocain, and adrenalin, so that pilocarpin was instituted. Internal medication consisted of cod liver oil, sodium salicylate, and sodium bicarbonate.

At the time of presentation the eye had healed with a large central leucoma and anterior synechiae. Vision was light perception; tension 15 mm. (Gradle-Schiötz). Dr. Adams asked for suggestions as to prognosis and further treatment.

Discussion. Dr. Wm. H. Crisp advised leaving the eye alone unless further complications arose.

Keratitis profunda and glaucoma accompanying herpes zoster ophthalmicus

Drs. Wm. C. and Wm. M. Bane presented M. B., a 55-year-old mechanic, who developed herpes zoster ophthalmicus in December, 1932. A severe pain in the right eye had developed January 6. The vision on December 24, 1932, had been 5/4; on January 9, it had been 5/20. Circumcorneal injection and a dark iris had been present. Atropin and hot fomentations had acted slowly, opening the pupil only one-third. The cornea had become slightly steamy with tension 33 mm. by Gradle-Schiötz. The atropin had been omitted and eserin had been instilled. One percent pilocarpin had been prescribed, and high frequency current had been applied; the tension had increased but caused no ocular pain.

Daily use of high frequency, pilocarpin, and sodium salicylate had been used. The tension had become normal January 18, and continued so. The cornea was partially hazy, especially the nasal half. The iris was now free and the eyeball moderately congested, with a few endothelial deposits. There was no tenderness. Vision was 5/50. No pathology had been found in the sinuses or teeth, but the tonsils looked abnormal.

Discussion. Dr. Von Brobeck said that pituitrin had been used with success in treating herpes.

Dr. W. A. Sedwick said he had had a case where glaucoma complicated herpes. The cornea had shown some staining.

Dr. C. E. Sidwell asked whether convalescent serum had been used in such cases.

Dr. W. H. Crisp said he had had several such cases with good outcome, in contrast to the poor prognosis that had been given by Lloyd in a recent paper.

Dr. S. Goldhammer mentioned the experimental work in which serum taken from herpetic lesions caused paralysis when dropped on the cornea of a rabbit.

Dr. Wm. C. Bane believed the corneal opacity was due to a toxin rather than the increased tension.

Dr. Wm. M. Bane said that according to Fuchs it attacked adults only and might be expected to show considerable improvement in two months or more.

Melanosarcoma of the ciliary body

Drs. Wm. C. and Wm. M. Bane presented T. Q., a 79-year-old man, who had been first seen January 13, 1933, because of blurred vision in the left eye for five days. He had suffered no pain. The vision of the right eye was 5/12 and of the left eye 5/60. Tension was normal in each eye. A rounded elevation was observed projecting upward behind the cataractous lens at the lower periphery. It appeared to be an immobile growth from the ciliary region. Transillumination gave a marked contrast through this area compared to that through other portions of the globe. Drs. Bane believed it to be a melanosarcoma of the ciliary body.

A few days later the eye was removed. The report from the laboratory of the University of Colorado Medical School was as follows: "The tumor is composed for the most part of small spindle cells, but scattered among these are many large round cells with one or more large nuclei. At the periphery of the growth many of the spindle cells are larger and more atypical in appearance. There is a great abundance of granular pigment, varying from brown to black, in many of the tumor cells and in the phagocytic cells between masses of tumor cells. There is a moderate number of mitotic figures. The tumor is situated in the region of the choroid, from which it appears to have arisen. At one end of the mass, tumor cells have infiltrated the ciliary body and have extended through it. The retina is pushed inwards over the tumor mass and is partly detached. It shows edema and many vacuoles of rarefaction. The sclera is not invaded."

Ectropion from exposure? or pemphigus?

Drs. W. M. Bane, John Long and Edna Reynolds presented T. G., a 55-year-old man, who 8 years previously without any history of injury had had a small sore on the nasal side of the lower lid. This had gradually spread to involve the nasal half of the lid, but the only symptoms had been tearing and discomfort while in the wind. For the last six years the lid had been markedly ectropic especially in the outer third which had become greatly thickened and hyperemic. The nasal half of the lid showed a loss of tissue and of cilia and the punctum was turned out. There were symblephara between the lower lid and globe on each side of the cornea. A recent biopsy had shown no malignancy.

A few days later Dr. Wm. M. Bane performed a plastic repair of the lid using the Kuhnt-Szymanowski technique. There was marked improvement. The lower punctum was still everted somewhat because of the scar tissue from the original ulcer on the nasal portion of the lid, but there was no epiphora.

Discussion. Dr. G. L. Strader believed the case was due primarily to exposure, for pemphigus of the conjunctiva would have shortened the conjunctiva and turned the lid in. Dr. Strader said that the epiphora from exposure would, through wiping the lid, cause ectropion of the punctum and thus cause a vicious circle. To correct the epiphora Dr. Strader advised the Gifford procedure of cutting well down through the conjunctiva to the bottom of the punctum at right angles to the lid margin. These out-turned puncta often became so small as to be very difficult to find.

Dr. J. M. Lamme said he had often used cautery punctures to touch up and complete the plastic work after an operation had grossly corrected an ectropion. Dr. Lamme said he had unsuccessfully tried Gore's method of drainage.

Absorption of traumatic cataract

Dr. R. W. Danielson presented A. A. D., a 24-year-old man, who on November 7, 1932, was chopping some tree roots when a piece of wood struck him in the right eye. When seen the next day one could observe a small corneal laceration, a moderately deep anterior chamber, and a rent in the anterior capsule through which lens material was protruding. The iris had not been injured

and the pupil had dilated well with atropin. A radiograph showed no foreign body present.

Until time of presentation the eye had always been very quiet, there having been no redness, tenderness, pain, increased tension, or endothelial deposits. The lens material had absorbed very rapidly so that when the pupil was dilated the patient was troubled somewhat by the monocular diplopia resulting from more than one clear space in the pupillary area. Dr. Danielson presented the case to illustrate the good result being obtained without resorting to surgery.

Brain tumor (fibrillary astrocytoma of third ventricle); successful operation

Dr. M. E. Marcove presented Miss H. H., a 14-year-old girl, who on January 13, 1932, had come for a new refraction. For the previous three or four months she had had occasional frontal headaches which were worse after reading. There had been no nausea or vomiting or inflammation of the eye. The vision without correction was poor, but with her correction of two years previous it was normal. Because of her tiring easily she had been told that she had a goitre, but her basal metabolic rate was minus 40 on one occasion, and minus 22 at another time. Examination of the eyes revealed nothing abnormal except a bilateral choking of the discs and a few striate hemorrhages in the fundi. The choking was three diopters O.D. and four diopters O.S. Field studies with a two degree test object showed form fields normal, blue and red slightly contracted, and blind spots enlarged. A neurologist reported her condition to be suggestive of brain tumor, but with no localizing signs. One x-ray picture was normal; another was reported to show a definitely enlarged sella and signs of increased intracranial pressure. Urine, pulse, and blood count were normal. Hemoglobin 77 percent.

During the time that all of these examinations were being done, the eye signs changed very little although there was a constant progression of the choked discs. Subsequent field studies taken at intervals of four or five days showed a cutting of the temporal fields in each eye for form with a more or less concentric contraction for colors. The field changes were more marked in the right eye. The enlarged blind spot remained about the same.

The patient was then referred to Dr. Cushing in Boston. Ventriculography was performed and the tumor was localized and later removed.

At the time of presentation she was entirely free from symptoms. The swelling of the discs had entirely receded, with no apparent atrophy and with the vision better than normal in each eye with correction. Her fields were entirely normal.

Discussion. Dr. W. T. Brinton said that he had seen a case of pituitary adenoma in which changes from a hyperemia to a choking of the discs developed in three months. The vision during that time decreased to light perception, but the discs and the vision returned to normal within a month after operation.

Vitreous opacities of unknown origin

Dr. G. L. Strader presented a 27-year-old army officer, who had come November 28, 1932, complaining of dim vision of the left eye and a dark spot in front of it, both of a week's duration. He had worn glasses ten years because of myopia. His vision with correction was 20/20 in each eye. Except for two or three rather long vitreous floaters in the left eye, both eyes were normal. A right upper first bicuspid tooth was found to have an apical abscess and was removed. On December 8, 1932, the condition was unchanged.

On December 16, 1932, he had made an auto trip to San Antonio and on his arrival there the vision was much worse. An oculist there made a diagnosis of iridocyclitis, due to sinus infection. The patient was also told that he had a white blood cell count of 12,000 and chronic infection of the ethmoids and antrum. He later went to New York City where another oculist disagreed with the diagnosis of iridocyclitis, but agreed that the nasal condition might be a factor.

On January 16, 1933, Dr. Strader

again found the vision 20/20 with correction, but the vitreous was now much more cloudy, with one large fly-wing opacity. On January 20, the blood Wassermann reaction was negative, the white blood cell count was 6,500, the polymorphonuclears being 56 percent. A postnasal whitish secretion was found on the left side with some chronic pharyngitis. The frontal sinuses and antra transilluminated well. Dr. Strader asked for opinion as to etiology.

Discussion. Dr. Wm. H. Crisp felt that mixed antiluetic treatment should be tried in spite of the negative blood test.

Dr. Von Brobeck suggested treatment with subconjunctival injections of dionin and 10 percent saline.

Dr. Maurice Marcove recommended the use of foreign protein.

Melanosarcoma of the iris

Dr. Edward Jackson reported the case of Mrs. S. E. T., aged 41 years. who had come with the history that a growth had been noticed on her right eye for 18 years. There had been no perceptible change in it until within the last two years when it had grown so as to encroach on the pupil. There was a yellowish circle, with a gray margin, about 5 mm. in diameter. It was evidently beneath the cornea and continuous with the iris, with a strikingly smooth, polished surface, where it was in contact with the cornea. The physician who sent her gave a history of her having had one attack of glaucoma, without pain or redness, but with dim vision for an hour which cleared up the next day. Her corrected vision was 1.2 in each eye. Media were clear, the fundus normal.

She returned to her home and deep x-ray therapy was tried, but she began to have attacks of pain, and at the end of six weeks the eye was enucleated. Sections showed melanotic sarcoma which was pressed against the cornea but had not invaded it. The small round cells seemed to be extending into the ciliary body. The enucleation of this eye with perfectly good vision was therefore fully justified.

Dr. Jackson said that some cases had been reported where the mass was limited to the iris and had been permanently cured by iridectomy, but that such a procedure was ordinarily not justified because of the frequency of recurrence and of metastases. Sections of the tumor were exhibited.

Discussion. Dr. Von Brobeck asked Dr. Jackson whether (as in this case) it were not true that Descemet's membrane acted as a barrier to the progress of tumor invasion.

Dr. Jackson answered that he believed such were the case not only for tumors but for disease processes, for he had seen cases where Bruch's (another glass) membrane had apparently resisted the passage of a tuberculous process from the choroid to the retina. He believed this fact was in some way related to the resistance to staining and to chemicals exhibited by such laminae vitrae.

R. W. Danielson,
Secretary.

NASHVILLE ACADEMY OF OPHTHALMOLOGY AND OTOLARYNGOLOGY

April 17, 1933

Dr. W. W. Wilkerson, Jr. presiding

An isolated muscle palsy due to cystitis

Dr. Fowler Hollabaugh reported a case of this condition. The patient, a white male, aged seventy-two years, had complained of diplopia for a period of five days. It increased on turning the eyes to the right. There was a partial paralysis of the right external rectus muscle. General physical examination, with the usual laboratory tests, including x-rays, revealed only pyuria and slight enlargement of the middle lobe of the prostate gland. A diagnosis of cystitis was made. Under treatment the pyuria disappeared within a few days and the palsied muscle rapidly regained its function. Within two weeks recovery was complete.

H. C. Smith,
Secretary.

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SUPPLEMENTARY TEST LENSES

The subjective measurement of errors of refraction is done by comparing the distinctness of the images obtained with different lenses. Such a comparison is most valuable when it is instantaneous. Even a short interval lessens the certainty of the choice. We get impatient when we are told: "Doctor, this glass is not as good as the one you tried yesterday." Or, "I could see better with the glass I had a while ago." We do not know which glass the patient means; but we do know that a comparison with what was seen yesterday, or ten minutes before, is quite worthless. Yet the exactness of immediate contrast is little understood, or utilized in refraction testing.

The visual acuity obtained at different times may be more affected by other things than by the glass before the eye. The illumination of test card, or background, the light adaptation of the retina, the fatigue of the eye, or the central nervous system, all modify the result. No matter how carefully these results may be recorded as obtained at one time, they may be quite misleading when compared with the result of such a test on another day, or at a different hour. The other variable factors in visual acuity are only eliminated by comparing the tests made with lenses that instantly succeed each other.

The time required to remove one lens from the trial frame and substitute another lens from the trial case, greatly lessens the value of the patient's judgment of their effects. The comparison to be worth making, must be made by changing instantly from one lens to another: and repeating the comparison over and over again in quick succession, until the patient is sure and the doctor also, that one lens is better than the other. This certainty can be secured by holding supplementary test lenses before the eye; and changing them in alternation, until patient and physician are fully convinced which is the better.

The repeating of tests on different days is to get the result when the patient is fresh, and his vision is at its best

—when he will discriminate most surely and accurately between images that are but slightly different. Tests are also repeated to get a large number of trials, so that they can serve to check each other; and thus eliminate the personal equation, or an inaccuracy that may have occurred in some one test. This repetition of the tests can be done very much more rapidly with supplementary lenses held before the eye, than with lenses placed in and removed from the trial frames. A much larger number of tests can be made at one sitting, and before fatigue begins to vitiate the results.

Sometimes a few supplementary lenses are supplied in pairs, a convex and a concave, mounted in a special handle so they can be readily alternated before the eye. But such arrangements are not adequate for general vision testing. Every lens in the trial case should be available for use as a supplementary lens. They should be mounted in flat rings with flat handles so that two lenses may be held, edge to edge, with the handles between thumb and finger, and thus instantly alternated before the eye. It is sometimes necessary to use thus the strong lenses of the trial case to get evidence of hyperopia or myopia in an eye with hazy media, on which objective methods of measurement cannot be used. Such mountings and such tests, extend the usefulness of any trial set.

For exact testing of astigmatism the cross cylinder, properly mounted, is the only kind of supplementary lens that makes possible the immediate reversal of effect and comparison of retinal images. If the axis of the cylinder is turned in the trial frame the effect is at first imperceptible, then it increases very slowly and only when the direction of the axis of the cylinder has been greatly changed is any effect noticed. With the properly mounted cross cylinder, the rotation of the handle instantly changes the cylinder axes 90°, reversing the effect. This gives the greatest possible certainty and significance to the patient's choice of positions; and the test may be repeated a dozen times, while turning the lens in the trial frame but once.

Accurate selection of lenses is what makes the correction of refraction important. Accurate subjective testing is best understood by the patient, and most likely to win cooperation in the wearing of glasses to get the desired results. The importance of accurate seeing by use of correcting lenses is only beginning to be understood by many eye physicians. The details that will help to force the facts about the appreciation of good sight upon the public may be the most important service we can render to them, or ourselves. Neither our ancestors, nor the lower animals have needed the kind of vision that we need and use every day.

Edward Jackson.

THE INCURABILITY OF SYPHILIS

Fifteen years ago Warthin, in a truly epoch-making address, based upon the wealth of pathologic material at his disposal in the medical department of the University of Michigan ("The new pathology of syphilis," the American Journal of Syphilis, 1918, volume 2, page 425) demonstrated that syphilis tended to become a relatively mild chronic process, and that its essential tissue lesion in the late or latent stages was "an irritative or inflammatory process characterized by lymphocytic and plasma-cell infiltrations in the stroma particularly about the blood-vessels and lymphatics, slight tissue proliferations, eventually fibrosis, and atrophy or degeneration of the parenchyma."

Syphilitic inflammations of this type are usually distributed widely throughout the entire body. The syphilitic person is a spirochete carrier, the spirocheta pallida being classed in this respect with the trypanosome, the malarial organisms, the lepra and tubercle bacilli, and the streptococcus.

Evidence of syphilitic infection was found by Warthin in forty percent of 750 autopsies on patients dying from miscellaneous causes. Judging by the

presence of the spirochete or of active syphilitic lesions, Warthin had never seen pathologically a cured case of syphilis. In other words syphilis was, and probably still is, incurable.

It is true that previous writers had found the frequency of syphilis much lower than announced by Warthin, who placed the incidence of the disease in this country at somewhere near thirty percent, and the death rate from this cause at appreciably above ten percent of all deaths. His explanation of the difference was that earlier investigators had based their conclusions upon the finding of actual gummatous lesions in the tissues, whereas the gumma is not the type of lesion of late or latent syphilis, and in all cases of latent syphilis the viscera are involved, not by gummatous processes, but by the specific inflammatory processes already referred to, usually mild in character, but acquiring pathologic importance because of their progressive tendency.

Among the disturbances which were commonly rated as syphilitic even before the discovery of the spirochete is interstitial or parenchymatous keratitis, as it is variably called. Since the introduction of modern remedies against syphilis, there has been a good deal of dispute as to whether this ocular complication was or was not favorably influenced by antiluetic medication. The general belief is that vigorous treatment with the arsenicals, mercury, and bismuth is called for in the presence of an interstitial keratitis and that the general result of such treatment is at least to shorten the course of the ocular malady.

The disturbing factor in this debate has been the experience that interstitial keratitis sometimes relapsed after most vigorous treatment with antiluetics, and that not very infrequently it developed in a patient who had received very persistent treatment along this line, even to the point of producing a persistently negative blood-Wassermann reaction. The latest type of treatment with malarial infection has not succeeded in preventing the subsequent development of interstitial keratitis. Thus, while Igersheimer said that almost none of his cases of this ocular disease had been previously under treatment for syphilis, Kufs has described a case of juvenile paralysis upon the basis of congenital lues, in which interstitial keratitis developed seven years after a course of malarial treatment with eleven febrile attacks.

In spite of its enormous usefulness in the treatment of fulminating symptoms of syphilis at any stage Ehrlich's "Therapia sterilisans magna" has unmistakably failed of its larger purpose, which was to cure completely and permanently, and apart from symptomatic relief syphilis may remain forever incurable.

In a brief but effective article vom Hofe (Klinische Monatsblätter für Augenheilkunde, 1933, volume 90, page 492) again asks the question whether treatment of congenital lues prevents the outbreak of parenchymatous keratitis. It is common experience that specific treatment of a unilateral parenchymatous keratitis does not prevent involvement of the second eye and such involvement of the second eye may occur many years later. As bearing upon the broader question whether children who have received earlier antiluetic treatment are protected against the corneal disorder, vom Hofe relates four case histories.

The first patient came at the age of eleven years with bilateral corneal involvement, in spite of a negative Wassermann. Beginning at the age of four weeks, the child had been under vigorous antiluetic treatment (neosalvarsan, and mercury inunctions) in the same clinic for several months on account of florid syphilis with strongly positive Wassermann reaction. As further evidence of the obstinacy of the syphilitic infection the author mentions the presence of rhagades and Hutchinson teeth.

A second child, twelve years old, came with unilateral parenchymatous keratitis in spite of a month's treatment with bismuth about nine months previously. A thirteen-year-old child had a unilateral relapse two years after vigorous treatment for bilateral keratitis, and in spite of prolonged treatment with salvarsan and mercury from the age of

six weeks and again after the first corneal attack. The fourth patient had a short attack of parenchymatous keratitis directly traceable to lodgement of a foreign body on the cornea at the age of twenty-five years, in spite of antiluetic treatment for two months in the same clinic for bilateral parenchymatous keratitis at the age of fourteen years.

The writer of the present comment had some years ago, in private practice, a most impressive experience along the lines of vom Hofe's report. A father of three boys, discovering that he had infected his wife with syphilis which he had contracted before marriage, established with her a frank understanding as to professional care of the children. The youngest boy, aged fourteen years, had had a positive Wassermann test one year previously and had been put on vigorous treatment with neoarsphenamin and other drugs. This treatment had been resumed upon appearance of interstitial keratitis three months previously, and was carried on systematically, although with intermissions, for nine months. A blood Wassermann, at first strongly positive, became negative, and the boy continued to grow rapidly and was apparently in the best of general health. Yet a recurrence of the corneal condition was experienced three years later.

Greatly as modern methods have improved the symptomatology of syphilis and prolonged the lives of its victims, it is certain that a complete cure for the disease has yet to be discovered, and that the only way to forestall the more profound and obstinate ravages of this disease is to prevent the primary infection. W. H. Crisp.

WESTERN OPHTHALMOLOGICAL SOCIETY

At the last meeting of the Pacific Coast Oto-Ophthalmological Society the project of a society confined to ophthalmology, exclusively for the west and mid-west, was considered. Letters had previously been written to certain members of the medical profession in this region who were specializing in ophthalmology. Most of the replies were said to have been friendly to the idea. The subject was discussed before the Pacific Coast Oto-Ophthalmological Society and the motion for the new organization was declared carried after a verbal vote. Officers were elected and tentative plans made for a meeting on the day preceding the meeting of the Pacific Coast Oto-Ophthalmological Society, a plan similar to that of the Association for Research in Ophthalmology in relation to the American Medical Association. The constitution was to be modeled after that of the American Ophthalmological Society.

It would seem that some definite purpose, impossible or at least most unlikely of accomplishment in the existing organizations, was necessary to justify the formation of a new society with the added time, trouble and expense entailed for each member of the profession entering the organization.

The reasons given for the formation of this new group were the need of a society devoted exclusively to ophthalmology as better representing the specialty and serving more as a stimulus to western ophthalmologists. It was also stated that there was an excess of material for which there was no appropriate outlet. A fact not mentioned was that there has undoubtedly been a feeling that the American Ophthalmological Society has not represented the West adequately, there having been too few members and meetings in that section of the country.

The first argument is extremely difficult to evaluate. The Pacific Coast Oto-Ophthalmological Society is an exceedingly wide-awake, active organization not unlike the American Academy of Ophthalmology and Oto-Laryngology. In the latter organization ophthalmology seems to be well represented and apparently this has been true in the former.

The second argument is valid regarding the number of papers but is less so when quality is considered. The Society has had excellent programs but it is doubtful if any important number of good papers has been rejected. That the criticism of the American Ophthalmo-

logical Society is well founded cannot be denied. A society limited to a small number and organized at a time when few oculists were located in the west was certain to contain eastern ophthalmologists for the most part, and consequently to keep its ranks filled with easterners and the majority of its meetings near the Atlantic seaboard. Whether there was hope of its becoming truly national or not is open to question though there has recently been a tendency toward a more national point of view. The formation of this new society will tend to thwart this accomplishment and may encourage division rather than unification of the specialty in this country.

It is questionable whether exclusive national specialty societies are the best thing for the profession. That these American invitation societies are most delightful for those on their rolls is undeniable and they have served a most important function as goals to be striven for by the specialist. The beginnings made by our most eminent physicians who were actuated by the highest motives, have been carried on by their followers. The tradition of high standards of science and ethics has been a vital force. The smallness of the organizations has made possible delightful intimacies incompatible with larger groups. Nevertheless one cannot help but notice the omissions in the membership lists, of many splendid and representative men and question the wisdom of national scientific societies requiring the initiative for membership to come from the organization. This has weakened these societies and has caused considerable unhappiness. To avoid these things it is to be hoped that if western eye physicians decide that they do wish a Western Ophthalmological Society, they will not make its membership dependent on invitation but will rather model it so every well qualified man will be eligible and may make application for membership and not have to await an invitation from a small group whose knowledge of those who ought to be included may be inadequate. The necessary qualifications may reasonably be placed very high so that inclusion in it may be something for which the young ophthalmologist may strive as a reward for outstanding achievement in his profession. The primary consideration in the question of formation of this new society must be the general good of the profession. This cannot always be foretold. Perhaps the trial should be made so that time may give the answer. It is unfortunate that such things are easier to start than to stop. We shall watch with interest the new development and hope that if undertaken it may prove to be of real value to ophthalmology.

Lawrence T. Post.

BOOK NOTICES

Lesiones del Fondo de Ojo, observadas en Venezuela (Lesions of the ocular fundus, observed in Venezuela). By J. M. Espino. M.D. Paper covers, 184 pages, not illustrated. Price not stated. Caracas (Venezuela) Lit. by Tip. del Comercio, 1933.

This is a membership thesis presented to the National Academy of Medicine of Venezuela. It is based upon the patients attending a private clinic at Caracas, including 1,225 patients who showed disturbance of the ocular fundus. It is entirely without pictorial illustrations. The statistics and brief clinical histories are given in nine chapters, on lesions of the optic nerve, lesions of the retina, neuroretinal lesions, lesions of the choroid, glaucomatous lesions, angiosclerotic lesions, circulatory and vascular lesions, traumatic lesions, and congenital lesions.

W. H. Crisp.

The anatomy of the eye and orbit, including the central connections, development, and comparative anatomy of the visual apparatus. By Eugene Wolff, ophthalmic surgeon, Royal Northern Hospital; pathologist and lecturer in anatomy to the Royal Westminster Ophthalmic Hospital; etc. Large octavo, cloth bound. 310 pages on enamel paper, 172 illustrations. Price $7.50. Philadelphia, P. Blakiston's Son and Co., 1933.

This particularly handsome and efficient volume can hardly be recommended too highly. It might well be officially recognized by the American Board for Ophthalmic Examinations as a textbook for those preparing for the Board's examinations. It is amazingly well illustrated, its text is composed and arranged with the utmost clearness, and the printing of the text and of the illustrations leaves nothing to be desired.

The volume is based mainly on lectures and demonstrations given as demonstrator of anatomy at University College, London, and as pathologist and lecturer in anatomy to the Royal Westminster Ophthalmic Hospital. Many illustrations, by a skilled artist, are from the author's own anatomic preparations; but the choice illustrations of earlier writers have also been used extensively, especially in the chapters on the development of the eye and on comparative anatomy.

The chapter on the nerves is valuable, and so especially is that on the optic nerve and its central connections. Among the best of the author's own anatomic preparations here pictured are his two dissections "to show the blood-supply of the optic pathway and the relations of the vessels to the oculomotor nerves."

Surgical complications of anatomic relationship are well considered, for example, under "Practical considerations" the effects upon vision and upon the pupillary reactions produced by division of the optic nerve, the chiasm, or the optic tract are clearly reviewed.

The statements and opinions of various investigators are carefully indicated, and each chapter terminates with an appropriate bibliography. The bibliography of the chapter on comparative anatomy is especially abundant. Unfortunately the index has hardly been prepared with sufficient attention to detail.

W. H. Crisp.

Bulletin de la Société Belge d'Ophtalmologie, no. 66. Transactions of the 66th meeting of the Society at Brussels. Paper covers, 80 pages, illustrated. Price not stated. Brussels, Imprimerie Médicale et Scientifique, 1933.

This report of the proceedings of the Belgian Society at its meeting on April 2, 1933, contains twelve original articles, all or most of which will be abstracted in this Journal.

W. H. Crisp.

Studies on the physiology of the eye. By J. Grandson Byrne. 428 pages. 48 illustrations. Cloth. H. K. Lewis & Co. Ltd., London. 1933. Price 40s.

The studies reported in this volume were made at different laboratories in England, Europe and America during the past twenty years. The material in part 1 (96 pages), "Paradoxical pupillary phenomena following lesions of the afferent paths" (9 chapters), was published in the American Journal of Physiology in the years 1921 to 1929. The remainder of the material in parts II, III, and IV (332 pages), has not been published before.

Part II includes sixteen chapters of experiments on "Preliminary palpebral widening; paradoxical palpebral and lens phenomena: inherent tonus phenomena." Part III is made up of thirteen chapters of stimulation experiments. Part IV, "Inherent pupillary constriction tonus and the mechanism of the still reaction, sleep, dreams, hibernation, repression, hypnosis, narcosis, coma, and related conditions," departs somewhat from the purely experimental, entering more into discussions and consequently easier and more entertaining reading.

The entire book gives evidence of most careful laboratory work and should prove of great value to those engaged in study of ocular physiology. It is very well prepared and presented. Summaries and conclusions follow most of the chapters rendering a quick survey of the book possible. There are numerous references and a complete index. It is in no sense a textbook of physiology of the eye but deals rather with most thorough experiments on certain phases of the subject.

Lawrence T. Post.

ABSTRACT DEPARTMENT

EDITED BY DR. WILLIAM H. CRISP

Abstracts are classified under the divisions listed below, which broadly correspond to those formerly used in the Ophthalmic Year Book. It must be remembered that any given paper may belong to several divisions of ophthalmology, although here it is only mentioned in one. Not all of the headings will necessarily be found in any one issue of the Journal.

CLASSIFICATION

1. General methods of diagnosis
2. Therapeutics and operations
3. Physiologic optics, refraction, and color vision
4. Ocular movements
5. Conjunctiva
6. Cornea and sclera
7. Uveal tract, sympathetic disease, and aqueous humor
8. Glaucoma and ocular tension
9. Crystalline lens
10. Retina and vitreous
11. Optic nerve and toxic amblyopias
12. Visual tracts and centers
13. Eyeball and orbit
14. Eyelids and lacrimal apparatus
15. Tumors
16. Injuries
17. Systemic diseases and parasites
18. Hygiene, sociology, education, and history
19. Anatomy and embryology

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6. CORNEA AND SCLERA

Duguet, J. **The anatomical lesion of neuroparalytic keratitis.** Arch. d'Opht., 1933, v. 50, June, p. 398.

A woman of sixty-one years suffered a left hemiplegia and left neuroparalytic keratitis due to syphilitic basal meningitis. Sections of the eye obtained on the seventh day of the disease showed punched-out areas in the corneal epithelium, beneath which were infiltrations of polynuclear leukocytes in the stroma. There was slight infiltration at the limbus and slight atrophy of the iris stroma. The ciliary body was unaffected. M. F. Weymann.

Jacobson, J. **The treatment of trachoma with Jacobson's solution.** Revue Internat. du Trachome, 1933, v. 10, April, pp. 100-107.

Jacobson reports on the results of treatment of 357 cases of trachoma with a solution of "éther-benzyl cinnamique," given intramuscularly. He states that the injections are painless and are not followed by local or general reaction. Treatment with this solution is followed subjectively in most cases by decreased irritation of the eyes, and objectively by diminished infiltration of the conjunctiva, absorption of granules, and healing of corneal ulcerations.
Phillips Thygeson.

Junès, E. **Treatment of the corneal lesions of trachoma with Jacobson's solution.** Rev. Internat. du Trachome, 1933, v. 10, April, pp. 107-109.

Junès employed the Jacobson's solution in a number of cases of trachoma which had proved rebellious to all other forms of treatment. He obtained rapid and favorable results in advanced corneal lesions and regards the solution as very valuable in treatment of trachoma.
Phillips Thygeson.

Mayou, M. S. **"White rings" in the cornea.** Brit. Jour. Ophth., 1933, v. 17, June, p. 342.

The author adds one case of this rare condition to the literature. A male aged fifty years had a mild keratitis profunda, doubtless due to antrum and ethmoidal sinus trouble. Examination with a slit-lamp showed down and in immediately beneath the epithelium a ring of brilliant white dots. (One illustration.)
D. F. Harbridge.

Michail, D. **Epithelial intrascleral cyst.** Arch. d'Opht., 1933, v. 50, June, p. 385.

A man aged twenty-four years suffered a perforating injury of the globe by a stick of wood and noticed a cyst three years after the injury. One year later the cyst extended from limbus to

posterior pole and partially encircled the optic nerve. After enucleation the globe was found shrunken and the entirely intrascleral cyst was lined by stratified epithelium resembling that of the cornea. (List of references, five photographs.) M. F. Weymann.

Petit, P. J. **Phlyctenular keratitis and trachoma.** Folia Ophth. Orientalia, 1933, v. 1, Feb., pp. 161-167.

Petit reports his experiences with phlyctenular keratitis in trachomatous patients and reports in detail a case which he was able to follow for over five years. He concludes that when the two diseases are in combination it is always necessary to treat the trachoma energetically. Phillips Thygeson.

Weskamp, C. **Punctate interstitial keratitis.** Arch. de Oft. de Buenos Aires, 1932, v. 7, June, pp. 340-342.

Punctate keratitis was the first diagnosis. The Wassermann was positive and the symptoms disappeared very rapidly with antiluetic treatment, which causes the author to conclude that the condition was of specific nature.
R. Castroviejo.

7. UVEAL TRACT, SYMPATHETIC DISEASE, AND AQUEOUS HUMOR

Adrogue, E., and Pereyra, R. F. **Atypical coloboma of the iris.** Arch. de Oft. de Buenos Aires, 1932, v. 7, April, pp. 195-198.

This is the report of a case with two atypical colobomas of the iris: a very small one directed toward the temporal side in the right eye, and a more pronounced coloboma directed toward the nasal side in the left eye.
R. Castroviejo.

Bietti, G. **Shell-like proliferations of the whole uveal tract with participation of the orbit. A contribution to the clinical picture of lymphadenosis and lymphosarcomatosis of the eye.** Klin. M. f. Augenh., 1933, v. 90, March, p. 308. (Ill.)

Clinical histories of two cases are given with anatomical descriptions of the enucleated eyes. The infiltrations in the first patient, a child of three months, consisted of cells larger than lymphocytes, which were considered as lymphoblasts. Cornea, sclera, retina, and the hyaloid lamella were not affected. The changes in the second patient, a man aged forty-six years, were interpreted as proliferation of lymphoid tissue, a process intermediate between lymphadenosis and lymphosarcoma.
C. Zimmermann.

Cordero, C. **Glutathione in pigmented and albino irides.** Arch. di Ottal., 1932, v. 39, Nov.-Dec., pp. 544-554.

From experiments the author draws the following conclusions: (1) The mean quantity of glutathione contained in the irides of some animal species (oxen, rabbits, calves, horses, hogs) is 16.68 milligrams per gram. (2) Such compounds attain their maximum in rabbits with dark irides (23 to 24 milligrams) and their minimum in oxen (11.26 milligrams). (3) The quantity of glutathione decreases as follows: rabbits, hogs, calves, horses and oxen; and is parallel with other values found in the iris and in the lens. (4) In the irides of albino rabbits there is a smaller quantity than in dark rabbit irides.
Herman D. Scarney.

Custodis, Ernst. **Contribution to the pathology and therapy of cysts of the iris and anterior chamber.** Klin. M. f. Augenh., 1933, v. 90, March, p. 361.

Within a year after a perforating injury of the cornea in a man aged twenty-eight years a cyst of the iris developed, which repeatedly relapsed after puncture. At the last puncture the wall of the cyst, which could not be entirely removed, was pulled through the wound under the conjunctiva and this sutured over it. After two weeks a fine grey membrane grew over the lens, but its progress was arrested by Roentgen radiation. Without anatomical examination it could not be decided whether this was due to intussusception of epithelium or to an implantation cyst. Operations on posttraumatic epithelial cysts of the iris are warned against if total extirpation is not possible. C. Zimmermann.

Derer, J. **Diagnosis of corneal and uveal tuberculosis.** Bratislavske Lekarske Listy, 1933, v. 13, June, p. 248.

Since it is seldom possible to arrive at a definite clinical diagnosis of such conditions, and since focal reactions are by no means without danger, the author attempted to demonstrate whether diagnosis might be reached by what he calls the biomicroscopic focal reaction and by examination of oscillations of intraocular tension due to the use of tuberculin. In nine cases of experimental keratitis and fourteen of experimental iridocyclitis in hares, after subcutaneous administration of tuberculin, oscillations in the tonometric curve were found constantly. Tension was reduced in every experimental case of keratitis and of chronic iridocyclitis, and was elevated in the cases of acute iridocyclitis with notable exudation. The biomicroscopic focal reaction proved to have little value. Control experiments with injections of milk instead of tuberculin were all negative alike as to variations in tension and as to signs of focal reaction. In thirteen human subjects (six keratitis and seven iridocyclitis) corresponding results were obtained, the variations in tension being always greater than those shown in the curve of normal tension. As regards the oscillations in tension, the test has the advantage of being provoked by very low doses of tuberculin, the author having found it necessary to use only 0.01 mg. or at most 0.05 mg. of tebeprotein. The reaction is also more constant than the ordinary focal reaction. W. H. Crisp.

Fasselova, M. **Iritis and hypertension.** Oft. Sbornik, 1932, v. 7, pp. 196-203.

At the eye clinic in Hradiste, during a four-year period, among fifty-six iris cases and twenty-six iridocyclitis cases, seven cases were complicated by hypertension. Five were over 50 years of age, and four were in males. In cases of serous iritis with slight increase of tension, atropin and adrenalin proved effective. In patients over sixty years of age miotics were necessary to reduce tension. An iridectomy was performed in one case which resisted conservative treatment. G. D. Theobald.

Finnoff, W. C. **A syndrome in uveal tuberculosis.** Trans. Sec. on Ophth., Amer. Med. Assoc., 1932, 83rd annual session, pp. 49-62. (See Amer. Jour. Ophth., 1933, v. 16, May, p. 461.)

Frant, Jiri. **Luetic iridocyclitis.** Oft. Sbornik, 1932, v. 7, pp. 172-186.

At the Czech Eye Clinic in Prague, during a five-year period, among 222 cases of iridocyclitis, forty (18 percent) were of luetic origin. Twenty-six had positive serum reactions. Fourteen cases had positive history with secondary manifestations of lues. The forms of iritis were thirty-two plastic, six papulous, two purulent. The small number of papulous iritis does not agree with former statistics and probably is connected with noticeable decrease of early luetic superficial manifestations observed during recent years. The author finds the prognosis of luetic iridocyclitis favorable, as the cases respond very readily to regular treatment. (Bibliography.)
G. D. Theobald.

Fuchs, A. **Hydropic swelling of the corneal epithelium.** Klin. M. f. Augenh., 1933, v. 90, March, p. 300. (Ill.)

Two cases of chronic uveitis lasting for years, with detachment of the retina and increased tension leading to blindness and enucleation, are described with histological findings. The epithelium of the cornea was thickened from hydropic swelling, the fluid not lying in the intercellular spaces but being absorbed by the protoplasm of the cells. An unusual periarteritis of the iris and nodules at the pupillary border suggest a specific disturbance of nutrition as the probable cause. It was remarkable that the intense histological changes of the epithelium were not noticed with the slit lamp as long as the superficial cells retained their luster and evenness of surface. C. Zimmermann.

Havel, Jaroslav. **Severe luetic iridocyclitis.** Oft. Sbornik, 1932, v. 7, pp. 278-281.

Ten years after a luetic infection, a man aged forty-nine years presented himself at the Prerov hospital with a severe papulous iridocyclitis in the left eye. The right eye was atrophied. He refused treatment, and within a few days returned with a well-developed exudative inflammation and practically blind. Large doses of neosalvarsan were given combined with other antiluetic therapy. Response was rapid, and the patient had 6/8 vision in sixty days.

G. D. Theobald.

Kriebig, Wilhelm. **Unusual foci of glia in the choroid.** Zeit. f. Augenh., 1933, v. 80, March, p. 23.

In a case of atrophy of the eyeball presumably consecutive to spontaneous iridocyclitis extensive subretinal foci of glia were found. Since there was no evidence of traction on the retina it is likely that the glia arose by primary proliferation. The glial foci in the clefts between choroid and scar tissue as well as the similarity between glial cells and some of the pigment cells in the glial foci suggest that in this case some of the proliferated glial tissue arose in pigment epithelium as well as from retinal glia. F. Herbert Haessler.

Mintscheff, P. **Unilateral reflex mydriasis at birth in dogs.** Graefe's Arch., 1933, v. 129, p. 518.

The author observed that among twenty-six bitches delivered in the clinic, fifteen showed at labor a transient reflex unilateral mydriasis when the pupillary reaction was neither directly nor indirectly influenced. This mydriasis always occurred in the right pupil and was always latent. It began a short time after the opening of the cervix, remained during labor and disappeared usually one day after its completion. In most cases, on the day after birth, the reflex became more pronounced if the mother came again to rest but it diminished in the condition of fatigue or in fever. H. D. Lamb.

Redslob, E., and Tremblay, J. L. **Study on gaseous exchange at the surface of the eye.** Ann. d'Ocul., 1933, v. 170, May, pp. 415-423.

Attempting to support the view of circulation of intraocular fluids and possible passing forward of carbonic acid, the authors found and measured CO_2 given off through the cornea. Their method consisted in applying to the cornea a contact cup through which air passed. The air was first cleansed of all CO_2, then moistened to prevent drying of the cornea. The air was collected and measurements made after circulating through the cup. The experiment was performed on rabbits for periods of one hour. On the human subject the same tendency proved true but the determinations were less accurate.

H. Rommel Hildreth.

Samuels, Bernard. **Significance of specific infiltration at the site of injury in sympathetic ophthalmia.** Arch. of Ophth., 1933, v. 9, April, pp. 540-559.

The author adheres to the theory of infection in sympathetic ophthalmia. A well-marked primary lesion points strongly to exogenous infection. One hundred and one eyes were examined, and in eighty-one cases microscopic sections passing through the wound were made. The cases were divided into five groups. Two cases in group two showed infiltration only at the site of the wound, and nine cases in group three showed an overwhelming amount of infiltration at the portal of entry. These eleven cases point strongly to primary infection. Against this theory were two cases in group four showing absence of infiltration at the wound, and ten in group five showing less there than elsewhere. The author feels that sympathetic ophthalmia is caused by a bacterium whose portal of entrance is an opening in the eyeball.

M. H. Post.

Villard, H., and Dejean, C. **Cysts of the iris.** Arch d'Opht., 1933, v. 50, April, p. 272.

This is the conclusion of the authors' exhaustive monograph and is followed by a very extensive bibliography. Emphasis is laid upon the biomicroscope in diagnosis of iris cysts. In general their evolution may be divided into

three periods: (1) a silent period of greater or less duration during which the cyst gradually increases in volume; (2) an interval of iridocyclitis, particularly in the case of parasitic cysts; (3) a stage of secondary glaucoma due to the increased volume of the cyst. Early treatment is indicated. The operation of choice is complete removal by iridectomy. In congenital cysts which are not enlarging one should not attempt treatment. Parasitic cysts should be completely extirpated as early as possible. In traumatic cysts extirpation should be done before the period of inflammation. If the volume of the cyst is too great for surgical intervention one may have recourse to electrolysis with considerable chance of success.

M. F. Weymann.

8. GLAUCOMA AND OCULAR TENSION

Alajmo, B. **The action of histamin upon the normal and the glaucomatous eye.** Rassegna Ital. d'Ottal. 1933, v. 2, Jan.-Feb., pp. 1-31.

Alajmo studied the action of histamin in various dilutions upon normal and glaucomatous eyes in man and lower animals. In glaucomatous eyes a three percent solution induced definite but not constant miosis, and hyperemia and chemosis more intense than in normal eyes. The effect upon the glaucomatous eye, unlike its effect upon the normal, was to elevate the tension. This is explained by dilatation and altered permeability of the capillary system in glaucoma. No definite results as to the physiopathology and biology of histamin could be determined in studies of the blood serum or aqueous.

Eugene M. Blake.

Albrich, K. **The question of experimental hypotony.** Graefe's Arch., 1933, v. 129, p. 468.

Experimental hypotony of the rabbit's eye was always associated with shrinking of the eyeball which could be measured by a determination of the volume and weight of the eye. Schmidt stated that the eye in rare instances proved to be larger and heavier although softer. Its enlargement was then explained as due to preceding overexpansion of the cornea and sclera from increased tension or to softening of its wall from disease without essential increase of tension. Schmidt's findings were not confirmed by Albrich, for those eyes which were softer before enucleation as the result of being treated with pilocarpin and adrenalin always proved to be lighter when the technique of the experiment was altered. The author's findings also contradict the opinion of Römer, who has contended that diminution of tension by pilocarpin and adrenalin in a glaucomatous eye is always associated with increased volume of the eyeball.

H. D. Lamb

Carvill, Maud. **A review of the cases of glaucoma admitted to the Massachusetts Eye and Ear Infirmary over a period of two years.** Trans. Amer. Ophth. Soc., 1932, v. 30, pp. 71-96.

In a statistical review of 457 cases the author classifies them as regards type, age, contributing factors, and so on. The importance of follow-up treatment by a social service department and the necessity for public education are emphasized. (Discussion.)

C. Allen Dickey.

Duverger, M. **The operation of Lagrange in the surgical treatment of glaucoma.** Arch. d'Opht., 1933, v. 50, May, p. 316.

Over a period of ten years one hundred and fifty cases of chronic glaucoma have been operated upon by the method of Lagrange, using a cataract knife for incision of the scleral tongue. In the past two years five or six cases of acute glaucoma have been operated upon in a similar manner, as have an unstated number of cases of secondary glaucoma and absolute glaucoma. From this experience it is felt that Lagrange's sclero-iridectomy should be the operation of choice in the adult for acute, chronic, secondary, or absolute glaucoma.

In chronic glaucoma where the tension does not exceed 40 mm. Schiötz the operation is practically always successful in maintaining the preoperative vision. No case has lost central vision as

a result of operation, even when the field was down to the fixation point. It is felt that simple iridectomy is not only inefficacious, but may aggravate the course of the disease. This is illustrated by a case where the iridectomized eye became blind sooner than the unoperated eye. In cases where the tension is from 40 mm. to 60 mm. Schiötz the prognosis is not so good, and the writer feels that this type of chronic glaucoma probably has a different etiological factor from those cases with lower tension. A filtration bleb should be obtained to insure success, and to this end the eye should be gently massaged for several weeks after operation. A peripheral iridectomy is included in the operation.

In acute glaucoma the fistulizing operation of Lagrange should be done to eliminate the recurrences which are experienced in a certain percentage of cases where only iridectomy has been done. In these cases a broad complete iridectomy is made in addition to the scleral excision.

The writer does not approve of iris inclusion operations because he believes the theory unsound, and he has found the Elliot operation unsatisfactory because of immediate and late complications. M. F. Weymann.

Kanda, K., and So, K. **Clinical observations on the intraocular tension of opium habitués in Formosa.** Brit. Jour. Ophth., 1933, v. 17, June, p. 354.

For the purpose of this report twenty-two opium habitués, hospitalized, under treatment for one month, and for the most part in good health, were studied. Readings with a Schiötz tonometer were taken once daily. The arterial blood pressure was also taken. Although opium habitués mostly have contracted pupils, and in the authors' cases the average diameter was 2.8 mm., the intraocular tension is either normal or somewhat above normal, the average values being 22.59 mm. Hg with the Schiötz tonometer using the 5.5 weight. Although opium habitués are in a parasympatheticotonic or vagotonic condition, and most glaucoma patients are also said to be in this condition, and conversely those who are in this condition may be more susceptible to glaucoma, the intraocular tension of opium habitués is generally normal, though in a few it was either a little above or even below the normal limit. The blood pressure of the opium habitué is, on the whole, hypotonic, the average systolic pressure being 113 mm. and the diastolic 75 mm. Hg.

D. F. Harbridge.

MacCallan, A. F. **The treatment of early cases of glaucoma.** Folia Ophth. Orientalia, 1933, v. 1, Feb., pp. 156-160.

MacCallan states that he has rarely seen a case of acute or chronic primary glaucoma in which there was not present in the body some form of gross sepsis, in mouth, tonsils, mastoid cells, intestinal tract, or elsewhere.

The indications for operation are discussed. The author always injects 0.25 to 0.5 c.c. of trivalin-hyoscin subcutaneously twenty minutes before operating, to numb the sensibilities of the patient. He always operates on the two eyes, whether or not the disease has declared itself in the other. Experience has taught him that the best chance of preserving vision in glaucoma is by performance of a decompression operation at the earliest possible stage of the disease. Phillips Thygeson.

Maddox, E. E. **A clinical note on glaucoma.** Brit. Jour. Ophth., 1933, v. 17, March, p. 161.

About five years ago the writer found that high frequency currents had the effect of almost immediately lowering the tension in nearly all moderately hypertense eyes. In one case only has an untoward sequel resulted. The application is from one to four minutes, and although the effect is more or less transitory repeated applications do good in the long run. The current may be applied directly, or by way of the operator's fingers, to the eyeball itself through the closed lids.

D. F. Harbridge.

Towbin, B. G., and Wilenski, L. I. **Vascular destruction in juvenile glau-**

coma. Zeit. f. Augenh., 1933, v. 80, April, p. 140.

During the past year only one case of juvenile glaucoma without enlargement of the eyeball was observed. The patient was most carefully studied and a number of deviations from a normal vascular system were found. The blood pressure was increased, the capillaries in the nail bed were abnormal, and there was impaired kidney function which became manifest in decreased powers of secretion and concentration. To the author it seems likely that the vascular abnormality was also present in the eye and was the cause of the glaucoma. F. Herbert Haessler.

Wilmer, W. H. **Spud for dissecting conjunctiva from sclerocorneal margin in trephine operation.** Trans. Amer. Ophth. Soc., 1932, v. 30, p. 387.

The spud has on its under surface the same curve as the cornea, and has the front edge round and smooth and the back edge sharp. It is especially useful when the conjunctiva is very thin.

C. Allen Dickey.

Wootton, W. H. **Cyclodialysis combined with iridectomy in glaucoma simplex; a preliminary report.** Trans. Amer. Ophth. Soc., 1932, v. 30, pp. 64-70.

Wootton first does a cyclodialysis above and then immediately performs a complete iridectomy in the usual manner. The root of the iris is freed of adhesions, and drainage then takes place through the filtration angle. Six cases are reported. (Discussion.)

C. Allen Dickey.

9. CRYSTALLINE LENS

Berens, C. and Sitchevska. O. **Complete discission of the crystalline lens.** Trans. Amer. Acad. Ophth. and Oto-Laryng., 1932, 37th annual meeting, p. 283.

The technique described differs from Ziegler's original technique in that a subconjunctival incision at the limbus has been substituted for the corneal incision. A single straight incision through the lens is a simpler procedure than the inverted-V-shaped incision and has apparently yielded comparable results. Complete discission was successfully employed in treating congenital, juvenile and traumatic cataracts, and was also useful for removal of the lens in myopia of high degree. The authors believe that complete discission of the lens offers the advantages of (1) fewer operations to obtain comparable results; (2) less reaction than anterior capsulotomy; (3) less likelihood of a secondary increase in tension; and (4) diminished risk of infection. The results of operations on human eyes and on animal eyes are tabulated. (Bibliography and discussion.)

George H. Stine.

Bourne, M. C., and Campbell, D. A. **The rôle of calcium in naphthalene cataract.** Brit. Jour. Ophth., 1933, v. 17, April, p. 220.

There is abundant evidence that hypocalcemia and cataract are both part of a syndrome of parathyroid deficiency. But at present there is no experimental evidence that low blood-calcium or even a disturbance of calcium metabolism is the cause of cataract. The workers report experiments in experimental naphthalene cataract.

The blood-calcium and the urinary excretion of calcium in rabbits were found to be fundamentally unchanged by prolonged naphthalene dosing, even where cataract was produced or where the toxic effects of the naphthalene caused early death of the animal. Although naphthalene was found to be without effect on calcium metabolism, there is the reverse possibility that blood-calcium may play a part in determining the effect of naphthalene on the eye; for an oats and cabbage diet, which protects the lens from naphthalene and prevents the development of cataract, was found to cause high blood-calcium (14.1 to 15.7 mg. per 100 c.c. serum) and a large urinary excretion of calcium (114 to 498 mg. daily); while a bran and carrot diet, on which cataract and toxic symptoms may be produced by naphthalene, is associated with much lower blood-calcium (8.6 to 10.7 per 100 c.c. serum)

and very small urinary excretion of calcium (4 to 39 mg. daily). (Tables and graphs.) D. F. Harbridge.

Chance, Burton. **Intracapsular extraction of the crystalline lens containing a foreign body.** Amer. Jour Ophth., 1933, v. 16, July, pp. 597-599.

Cordero, C. **Glutathione in the normal and cataractous lens.** Rassegna Ital. d'Ottal., 1933, v. 2, nos. 1-2, pp. 69-87.

Cordero examined for glutathione the clear and cataractous lenses of 255 cases, human and animal. He found that the amount of reduced glutathione varied in normal lenses from animal to animal and between animal and man. The greatest amount was present in the rabbit's eye, 261.96 mg. per 100 gm. and least in that of the horse, 71.50 mg. per 100 gm. The quantity decreased slowly but progressively in relation to the interval of time elapsing since death, and cold produced a regular and notable decrease. In mature cataract the amount of glutathione was not measurable. In experimental cataract the quantity of the tripeptide diminished parallel to the development of opacification of the lens. Eugene M. Blake.

Courtney, R. H. **Endophthalmitis phacoanaphylactica with secondary glaucoma.** Amer. Jour. Ophth., 1933, v. 16, June, p. 530.

Gomez Marquez. **Some observations on the various stages of cataract extraction.** Arch. de Oft. Hisp-Amer., 1933, v. 33, April, p. 264.

Success in intracapsular extraction depends on rigorous procedure, and rapidity of execution at the expense of meticulous technique is responsible for failure. Blepharostasis by sutures in the upper and lower lids weighted down by forceps is preferred to digital and instrumental elevation. At the end of the operation these sutures are used to insure occlusion of the eye. Van Lint akinesia and anesthesia combined with subconjunctival adrenalin injection must be perfect to produce maximal dilatation of pupil. The superior rectus is used for fixation of the globe since it is paralyzed with difficulty. Other necessary details are: canthotomy, a corneoscleral safety suture, a sufficiently large corneal flap, a very peripheral iridectomy, the use of the erisiphake, immediate pulling and tying of the first suture, and supplemental suturing of conjunctival flaps. M. Davidson.

Green, John, and Beisbarth, Carl. **Extraction of congenital and young adult traumatic cataract by the method of Barkan.** Amer. Jour. Ophth., 1933, v. 16, July, pp. 603-606.

Kirwan, E. O'G. **Diabetic cataract.** Brit. Jour. Ophth., 1933, v. 17, June, p. 346.

In Bengal, diabetes is a very common disease. The case histories of four cases of diabetic cataract with definite morphological features are discussed. They ranged from twenty-two to thirty years. All were successfully operated upon, without complicating hemorrhage. Blood sugar should be brought near normal before operation. (Six photographs.) D. F. Harbridge.

Krause, A. C. **Chemistry of the lens. II. Composition of Beta crystalline, albumin (Gamma crystalline) and capsule.** Arch. of Ophth., 1933, v. 9, April, pp. 617-624.

Material from many thousands of eyes was used. The Beta crystalline and albumin were prepared and purified by methods previously published by the author. (Archives of Ophthalmology, 1932, volume 9, page 166). Proteins were then analyzed by the Van Slyke method; tyrosine, tryptophan, and cystine according to the colorimetric method of Folin and Marenzi. The analyses showed the four lens proteins and the capsule to include a carbohydrate group in their structure. M. H. Post.

Lopez Lacarrère, J. **Electrosurgery of the lens. "Electrodiaphakia": instrumental and other indications.** Arch. de Oft. de Buenos Aires, 1932, v. 7, June, pp. 323-334. See also Ann. d'Ocul., 1933, v. 170, April, p. 273; Arch. de Oft. Hisp-Amer., 1932, v. 32, June, p. 293; Klin.

M. f. Augenh., 1932, v. 88, June, p. 778; Rev. Cubana de Oto-Neuro-Oft., 1932, v. 1, May-June, p. 149; and abstracts Amer. Jour. Ophth., 1932, v. 15, Oct., p. 1001, and 1933, v. 16, Feb., p. 178.

The author also recommends his handle for performing multiple scleral electrocoagulation in the treatment of detachment of the retina. Special curved tubes adapted to the handle will permit of coagulating areas of sclera beyond the equator. R. Castroviejo.

O'Brien, C. S. **Experimental cataract in vitamin G deficiency.** Trans. Amer. Ophth. Soc., 1932, v. 30, p. 245. (See Amer. Jour. Ophth., 1933, v. 16, April, p. 375.)

Pereira, R. F. **Brief note about the Elschnig forceps.** Arch. de Oft. de Buenos Aires, 1932, v. 7, June, pp. 358-359.

The author has devised a new forceps to be used for cataract extraction, which has all the characteristics of the Elschnig forceps, but is shorter, increasing thereby the sense of touch.

R. Castroviejo.

Rezende, Cyro de. **Present status of the cataract operation.** Rev. de Ophth. de São Paulo (Brazil), 1933, v. 2, March, p. 164.

This paper, read before the ophthalmological society of São Paulo, is a brief description in Portuguese of the leading modern methods of cataract extraction, with particular emphasis on intracapsular procedures.

W. H. Crisp.

Salit, P. W. **Calcium content and weight of human cataractous lenses.** Arch. of Ophth., 1933, v. 9, pp. 571-578.

One hundred and three human lenses extracted in capsule were examined with regard to calcium content and weight, during the incipient, intumescent, and mature stages of cataract formation. The calcium content in these three stages was found respectively 5.8 mg., 30.5 mg. and 50.9 mg. per 100 gm. In the same order, the average weights of the lenses were found to be 0.2026 gm., 0.1989 gm., and 0.1890 gm. The author concludes that the relative amount of calcium may furnish an index as to the stage of development.

M. H. Post.

Vele, M. **Ambard's constant in senile cataract.** Rassegna Ital. d'Ottal., 1933, v. 2, nos. 1-2, pp. 89-92.

Vele determined the relationship existing between the quantity of urea in the blood and that in the urine in forty cases of senile cataract. This relationship is known as "Ambard's constant." The ureometers of Ambard and of Esbach were employed in all cases. The conclusion was that the turbidity of the lens could not be related exclusively to defective renal filtration.

Eugene M. Blake.

Weinstein, Paul. **Parathyroid cataract.** Brit. Jour. Ophth., 1933, v. 17, April, p. 236.

Some authors suggest the possibility of a relation of parathyroid cataract to blood-calcium. The author considers this very dubious. His observations have proved that the capsule of the lens keeps a positive cysteine test for the longest period. The writer reports the cysteine reaction and in relation to two more cases of parathyroid, five cases of zonular cataract, and one case of cataract produced in vitro.

In one of the parathyroid cases the lens first extracted was found considerably reduced in the sagittal direction, and the lens extracted without its capsule gave a definite cysteine reaction. In the second case technical difficulties prevented the author from carrying out the reaction on the lens first extracted. The second lens, extracted four months later, gave a definitely positive cysteine reaction. The reaction was also positive in the five cases of zonular cataract, and in a pig's lens clouded in vitro by hypertonic salt solution.

D. F. Harbridge.

Wood, D. J. **A case of congenital cataract showing unusual features.** Brit. Jour. Ophth., 1933, v. 17, March, p. 158.

In the center of the pupil of each eye of a colored boy was a dense circle

of capsular opacity, with a raised epicapsular spot, and several specks, remains of lens matter. Around this central opacity was a flat slate-colored band, notched at its inner margin. Careful examination showed them to be thinned parts through which the dark interior was seen. The periphery was stamped by the impress of the uvea. Evidently the lens was largely absent. With a discission needle the dense central part was easily separated as a disc, and this was removed from the anterior chamber. The fundus was normal and the vision good. The condition, doubtless, is prenatal. (Two illustrations.) D. F. Harbridge.

10. RETINA AND VITREOUS

Addario, C. **Surgical cure of retinal detachment.** Folia Ophth. Orientalia, 1933, v. 1, Feb., pp. 211-217.

Addario refers to his paper of 1889 dealing with the surgical treatment of two cases of retinal detachment, to claim priority for the method now known as Gonin's method. The author states his views on the etiology of detachment. In progressive myopia he believes that detachment is the last episode in the progressive detachment of the vitreous. In this condition there is always a liquid lamina between the vitreous and the retina and in this liquid the detached vitreous is agitated continuously, sometimes to such an extent as to tear the preequatorial retina. The subvitreous fluid is then allowed to pass suddenly under the retina. Because of the vast alteration of the vitreous preceding the detachment, the retinal detachment is to be considered incurable. The immediate results of surgical treatment may be favorable but the effect is only temporary. Thus it is absolutely necessary to diagnose the detachment of the vitreous in order to be able to prevent the disease. This diagnosis, often neglected by the ophthalmologist, can be made by means of endoptic and ophthalmoscopic examinations.

Phillips Thygeson.

Adrogue, E., and Pereira, R. F. **A rare aspect of the fundus.** Arch. de Oft. de Buenos Aires, 1932, v. 7, June, pp. 335-339.

The retinal vessels were increased in number and surrounded by white sheaths at the papilla and its vicinity. The disc protruded slightly. The blind spot was enlarged, and the field contracted toward the nasal side. The vision was not altered. The authors conclude that the peculiar fundus findings were a sequel of an inflammatory condition. (Photograph and bibliography.)

R. Castroviejo.

Arruga, H. **Etiology and pathogenesis of retinal detachment.** Arch. de Oft. Hisp.-Amer., 1933, v. 33, May, p. 312.

The incidence of detachment of the retina increases with age. Two-thirds of the cases are in males, and this is without relation to the factor of industrial accident. Fifty to sixty percent are in myopes. About 17.5 percent are bilateral. Trauma is rare as immediate cause and gives rise to disinsertion or tear at the ora. The author's experimental studies of subretinal fluid in thirty-eight cases show low albumin content and low density at first, with increase of these later, accompanied by leucocytes and pigment cells. In the older cases the density is again low, coinciding perhaps with choroidal atrophy. In experimental production of detachment in rabbits India-ink injection showed circulation toward the subretinal space only in presence of a hole. There was a tendency to spontaneous cure when no hole was made, and permanent detachment was found difficult to produce. Horseshoe-shaped hole is commonest, the ends directed toward the periphery. This is due to radial direction of nerve fibers. Retinal atrophy and thinning are the most important predisposing factors. Low grade choroidal inflammation and tuberculosis may accompany and be responsible for the retinal atrophy. Lower detachments do not commonly lead to secondary disinsertions, although the retinal nerve fiber layer does diminish in thickness toward the periphery. Rest and aspiration, without perforating the retina, would seem to be indicated in detachment without hole. M. Davidson.

Beauvieux and Bessière. **Ocular disturbances in the course of two leukemic syndromes.** Arch. d'Opht., 1933, v. 50, June, p. 377.

The first patient, a woman seventy-nine years of age, showed such marked swelling of the lids that they could scarcely be opened. The tumefaction appeared suddenly, without pain, and showed no pulsation. Later some enlargement of regional lymph nodes appeared. The diagnosis was only made apparent by examination of the blood, which showed 115,000 white cells with a differential count indicating a myeloid type of leukemia. In the second case a white blood cell count of 282,000 was found in a woman thirty-six years of age whose ocular complaint was total loss of vision. The right eye was found to have a massive vitreous hemorrhage, while the left showed a typical retinitis proliferans. According to the history there had been a similar hemorrhage in the left eye three years before, which gradually absorbed and was followed by the proliferative retinitis.

M. F. Weymann.

Butler, T. H. **Hemorrhage into a prolapsed vitreous pouch.** Brit. Jour. Ophth., 1933, v. 17, June, p. 343.

The exact structure of the vitreous is still open to discussion. With the slitlamp a series of waving membranes are observed. Some authors, Duke-Elder for example, believe that this is merely an optical phenomenon. On the other hand Ida C. Mann believes that the membranes are real. This latter view seems to find confirmation in the case now reported.

A male aged sixty-six years had had simple extraction of the right lens, the vitreous was quite clear and the fundus normal, but vision was only 6/60. Preliminary iridectomy on the fellow eye was followed by a large hyphema with hemorrhages on the iris. About one month later the lens of this eye was extracted. Conditions were normal up to the seventh day, at which time the anterior chamber was half full of blood. After absorption, recurrence, and ultimate absorption, posterior synechiae remained. Discission was performed upon an opaque membrane covering the pupil, but about two months later the best acuity was fingers at a half meter. About three months later the patient returned, stating that his sight had gradually improved then suddenly got worse. The eye was free from inflammation and the anterior chamber contained no blood. With a Mackie slitlamp there was observed a prolapse of vitreous into the anterior chamber, forming a biloculate pouch half full of fresh blood. This seems to prove that the vitreous either contains membranes or is capable of forming them rapidly when prolapsed.

D. F. Harbridge.

Edmund, C. **Dysaptatio visualis.** Trans. Ophth. Soc. United Kingdom, 1932, v. 52, pp. 249-257.

The author deals with the faculty of discerning differences of brightness, expressed by the so-called Bouguer-Fechner fraction, the numerator of which is the difference of brightness of the two surfaces, and the denominator the brightness of one of them. The smaller the value of the fraction, the keener is the power of distinction which the fraction represents. The technique of the test is given in detail, and a curve illustrates this faculty in the normal eye and in congenital hemeralopia, idiopathic hemeralopia, retinitis pigmentosa, choroiditis, and chronic glaucoma. Nyctalopia and hemeralopia are characterized as cases of visual disadaptation, "dysaptatio visualis." T. D. Allen.

Evans, P. J. **Some aspects of vascular change in the fundus oculi and of retinal arteriosclerosis in particular.** Brit. Jour. Ophth., 1933, v. 17, May, p. 257.

This thesis concerns itself with a rather full discussion of the vascular sclerotic changes within the eye, illustrated by composite photographs of pen and ink sketches, photomicrographs, and a tabulated study of four groups. The first group consists of twenty-eight cases covering the whole range of vascular changes; the second group consists of ten cases of hemiplegia; the third group is a review of

the notes of over one hundred and fifty cases from consulting practice; the fourth a few cases examined at the Birmingham General Hospital.

Retinal arteriosclerosis occurs in conjunction with general vascular changes but it is not a reliable indication of the degree of such changes. Early retinal arteriosclerosis is first evident in the veins. Examination of the fundus affords an opportunity for study of the small arteries which cannot be obtained elsewhere in the body. In cases of hypertension a study of the caliber of arteries and arterioles affords valuable data. The degree of retinal arteriosclerosis may vary in the two eyes, or in the event of a "stroke" the vascular changes may be local. In cerebral vascular accidents the heart may be normal or at most hypertrophied. In early signs of renal inefficiency the retinal changes may be more evident than changes elsewhere in the vascular system. Retinal exudate is not a common feature of arteriosclerosis, but is usually late and of grave prognosis. Many of these exudates very probably originate in changes in the choroid. The prognostic significance of retinal arteriosclerosis is unreliable, yet its presence should arouse caution. The author points to its chronicity and to the fact that it may exist for many years without evidence of gross ill-health.

D. F. Harbridge.

Filippi-Gabardi, E. **Congenital malformation of a proliferative type on the papilla and retina.** Rassegna Ital. d'Ottal., 1933, v. 2, nos. 1-2, pp. 117-135.

Filippi-Gabardi analyses the forty-two cases, previously reported in the literature, of a peculiar proliferation of tissue upon the papilla, and adds a case observed by himself. His patient aged twenty-four years presented ectopia lentis et pupillae with cranial malformation and double optic canals.

The picture closely resembles a proliferating retinitis, particularly developed upon the papilla and the lower quadrant of the retina. The author thinks it is impossible to say whether the condition is an anomaly of development or a result of an intrauterine inflammatory or hemorrhagic process. (Illustrated.) Eugene M. Blake.

Gebb, H. **Gonin's ignipuncture.** Zeit. f. Augenh., 1933, v. 80, March, p. 1.

The author performed Gonin's ignipuncture in simple retinal detachment and in forty percent of the cases the result was satisfactory.

F. Herbert Haessler.

Gonin, J. **My experiences with electrocoagulation in detachment of the retina.** Arch. d'Opht., 1933, v. 50, May, p. 336.

In the past few months the writer has employed the high frequency current in treatment of detachment of the retina both in the indirect manner, as in application to the sclera without puncture, and in the direct manner as used by Weve and Safar, where puncture of the sclera is made with the electrode.

From sixteen cases treated by electrocoagulation, or by a combination of electrocoagulation and thermopuncture, definite conclusions are drawn, although only as to immediate results. The writer thinks that the high frequency electrode is not apt to supplant the thermocautery, but that it may be used to advantage to replace it in cases in which it is necessary to create a chain of adhesions on account of a large tear close to the choroid or an inferior disinsertion, or where the media are in such condition that accurate localization of the tear is impossible. Where thermopuncture fails to close a large tear electrocoagulation may be of assistance in completing the operation. It has been shown that hemorrhages and secondary tears may occur after electrocoagulation as well as after thermopuncture. The dosage is difficult to regulate, so that beginners are recommended to follow the example of Weve and acquire a certain experience with thermopuncture, of which the technique is simple before using electrocoagulation. Gonin thinks that if his first therapeutic attempts had been made with chemical cauterization or diathermy he would have had difficulty in arriving at precise conclusions as to conditions under

which closure of retinal tears should or could be done. M. F. Weymann.

Gresser, E. B. **Studies of retinopathies.** Amer. Jour. Ophth., 1933, v. 16, July, pp. 612-619.

Jaffe, M., and Schonfeld, W. A. **Lipemia retinalis due to diabetes mellitus.** Arch. of Ophth., 1933, v. 9, pp. 531-537.

Forty cases of this condition in all have been reported. The relation of lipemia retinalis to lipemia, and of both to fat metabolism, is as yet uncertain. From the author's studies, and from various reports, they feel that lipemia retinalis is dependent not only upon the fat content of the blood, but also upon the presence of acidosis. It is more constant in younger patients than in older. It may be cleared up by the administration of large quantities of carbohydrate, combined with insulin in such amounts as to clear up the acidosis.

M. H. Post.

King, E. F. **A series of thirty-one cases of retinal detachment treated by diathermy.** Brit. Jour. Ophth., 1933, v. 17, May, p. 287.

Gonin's method of cautery puncture for detachment was begun at Moorfields Hospital in December, 1929, and the analyzed results of 200 cases showed 27.5 percent cured. Because cautery puncture traumatizes the vitreous and is often followed by excessive scarring; and because this operation requires extremely accurate localization of the hole, the Guist operation of multiple trephining was introduced, and later modified in accordance with the method described by Larsson. The latter is similar in principle to the Guist operation, the only essential difference being that Guist uses caustic potash to produce the choroidal reaction while in the Larsson method diathermy is employed.

The present series, observed from August to October, 1932, were treated by diathermy current (as described by Larsson). Eighteen (58.06 percent) were cured. One of the cured cases recorded was of detachment following removal of an intraocular foreign body. Larsson's method is as follows: The meridian is marked on the limbus, after locating the hole with an ophthalmoscope, and the latitude is determined by the use of a guide stitch and calipers, allowing 8 mm. from the limbus to the most anterior portion of the fundus visible in emmetropes and 9 mm. in myopes, and 1.5 mm. for each disc diameter of ophthalmoscopic measurement.

After having ascertained the surface marking of the hole it is marked on the exposed sclera by a turn or two of a trephine. The point of an electrode, which is a piece of platinum wire about 0.66 mm. in diameter and 1.5 inches long, is applied to the sclera and the current of about 0.75 ampere turned on for five seconds. The amount of current may be cautiously increased. This is repeated over the required area at intervals of 1.5 mm. The subretinal fluid is drained by allowing the electrode to remain where the detachment is deepest or by trephining.

From his experience the author concludes that in diathermy we have a preferable method; and that cases in which no hole can be found and those in which a previous operation of any type for detachment has been done offer small hope of success. The prognosis is much less favorable when the detachment is of long standing. Finally, as might be expected, almost all cases showing inflammatory signs, posterior cortical lens changes, gross vitreous opacities, and hypotension do badly, while those with relatively clear vitreous, discrete hole or holes, and normal tension are the most favorable.

D. F. Harbridge.

Klein, M. **Localization on the fundus; contributions on meridian faults; a new localizing perimeter.** Brit. Jour. Ophth., 1933, v. 17, March, p. 145.

In localization on the perimeter the distance is not estimated from the ora serrata but is measured on the perimeter, the meridian being determined by the angle which the plane of the perimeter arc forms with the horizontal, and the latitude by the angle which

is formed by the line in which the ophthalmoscopic examination takes place and the line of sight of the eye to be examined. In determination of the latitude we must know what distance on the eye corresponds to the value of the angle read on the perimeter. Tables, graphs, and equations are found in the literature. The author depicts a localizing perimeter devised by himself.
D. F. Harbridge.

Kleiner, Leo. **Intraocular tension in retinal detachment.** Graefe's Arch., 1933, v. 129, p. 485.

The difference in tension between an eye with detachment and a normal eye was generally about 4 mm. of Hg. In three-fourths of the cases, the tension in the eye with detachment was lower than in the other, and equally so whether the detachment was recent or old. In fifty percent of all eyes with detachment the tension was less than 16 mm. of Hg. Usually, the older the retinal detachment the less the intraocular tension. In 66.6 percent of the cases, in at most a few weeks after healing of the detachment, there was an increase of tension. The more extensive the detachment, the greater the difference in tension between the normal eye and the eye with detachment. In at most four months after healing of the detachment, the tension in both eyes was usually the same. The contention of Leber as to absorption of vitreous through the capillaries of the choroid, and that of Lindner concerning the mechanism of detachment with normal vitreous, receive further confirmation through these results. H. D. Lamb.

Lopez Lacarrère, J. **Electrosurgery of the lens. "Electrodiaphakia": instrumantal and other indications.** Arch. de Oft de Buenos Aires, 1932, v. 7, June, pp. 323-334. (See Section 9, Crystalline lens.)

McAlpine, Douglas. **Hypertensive retinitis.** Lancet, 1932, v. 223, Nov., 26, p. 1152.

The author gives a detailed discussion of the etiology and terminology of retinal changes, and urges that the terms "renal retinitis" and "albuminuric retinitis" be supplanted by "hypertensive retinitis." Four illustrative cases are given. (Twenty-three references.) Ralph W. Danielson.

Perez Bufill. **A case history of complete and permanent cure of retinal detachment.** Arch. de Oft. Hisp.-Amer., 1933, v. 33, April, p. 215.

The writer prefers Gonin's method in cases with visible and accessible holes. Sourdille's method gives immediate results and has the advantage that it can be repeated. Multiple trephinings, chemical coagulation, and diathermy are rejected. Tuberculin treatment after operation is advocated. (Illustrated.) M. Davidson.

Pollock, W. B. **Report on two cases of cerebromacular familial degeneration reported as two cases of Leber's disease.** Trans. Ophth. Soc. United Kingdom, 1932, v. 52, pp. 220-223.

The author gives a résumé on a girl eleven years old and her brother eight years old, first seen in 1915, and reported in 1917 as Leber's disease. The girl died in 1925 and the boy in 1927. During the eighteen months before death each patient had had repeated convulsions in cycles about every three weeks, with relapse and stupor until the next cycle of convulsions. Both were completely blind and paralyzed. The parents were not blood relations nor were they Jews. The father was quite normal, having 6/6 vision in each eye. The mother had one normal eye and one myopic 30.00D., and divergent strabismus; she had had two miscarriages and a still-born child before these two children were born, and one miscarriage after. The Wassermann on both children and on the mother was negative, and antisyphilitic treatment had not helped the children.
T. D. Allen.

Raadt, D. L. E. de. **What poison produces diabetic retinitis?** Graefe's Arch., 1933, v. 129, p. 574.

The author concludes that not only the spasm but also the histologic changes of the retinal vessels (hyalin degeneration and sclerosis of their

walls, partial thrombosis and hemorrhages) in diabetic retinitis as well as in nephritic retinitis are entirely caused by the ammonia in the perivascular edema. H. D. Lamb.

Scheerer, R. **The ocular fundus in hypertension.** Med. Klin., 1933, Feb. p. 245.

The author describes the relation of arteriosclerosis as seen in the retinal vessels to hypertension and changes in the kidney and other organs. Macular degeneration of Junius and Kuhnt, and also retinitis circinata, may be secondary to arteriosclerosis of the choroidal vessels, both giving a different prognosis as to length of life in comparison with those conditions associated with marked involvement of the retinal vessels. The author also states that chronic conjunctivitis in older people may be the result of congestion due to arteriosclerosis. Beulah Cushman.

Stallard, H. B. **The histological appearances of an eye successfully treated by diathermy for retinal detachment.** Brit. Jour. Ophth. 1933, v. 17, May, p. 294.

The patient was a male aged seventy-four years with detachment of the retina in the right eye of a few days duration. The detachment occupied the upper temporal quadrant, with a tear in the ten o'clock meridian between the equator and the ora serrata. The retina of the left eye had been detached for some years. Nineteen days after a successful diathermy treatment the patient died of pulmonary thrombosis.

The histological picture induced by the application of diathermy to the sclera in the treatment of retinal detachment is that of a localized uveitis. Buds of granulation tissue herniating through Bruch's membrane play an important part as the grappling irons that secure the detached retina when it has come alongside the choroid after the subretinal fluid has been drained. These buds of granulation tissue contain fibroblasts, the precursors of fibrous tissue. Repair is eventually perfected by chorioretinal fibrous tissue adhesions. It is evident from this specimen that diathermy applied near the ora serrata is apt to induce cyclitis, and the amount of fibrous tissue formed in the circumlental space in this specimen suggests that more remote complications would have followed.

D. F. Harbridge.

Terrien, F., Veil, P. and Dollfus, M. A. **The results of different operative techniques in detachment of the retina treated from October 1, 1930, to March 1, 1933.** Arch. d'Opht., 1933, v. 50, May, p. 331.

One hundred and ten cases of detachment of the retina were operated upon with forty-six cures. Fifty-one were treated by the thermopuncture of Gonin with twenty-five cures, of which four showed recurrence. Twenty-five patients were treated by the suprachoroidal galvanocauterization of Paufique, and of these eleven were cured, five were benefited, and six showed no improvement. The technique of Guist-Lindner was used in twenty cases, five of which showed tears. In this group with tears one cure was obtained. In the fifteen without tears five were cured with one recurrence in three months. With multiple perforating puncture and galvanocauterization six patients were operated upon and only one, who showed no tear, was cured. Eight patients were operated upon by diathermo-coagulation, and of these one with a tear was cured but had a slight recurrence one month later. In summing up, forty-five percent of the patients with tears were successfully treated, while only thirty percent without tears obtained reattachment. The greatest percentage of success was obtained with the method of Gonin. It is concluded that exact obliteration of the tear is of the utmost importance in obtaining a cure. Preference is given to suprachoroidal galvanocauterization where obliteration is impossible by simple puncture on account of multiplicity or large extent of tears. Bed rest is recommended for several days prior to operation because it allows partial reapplication of the retina and better localization of the tear.

M. F. Weymann.

Urrets Zavalia, A., and Brandan, R. A. **Fundus oculi in hypertensive diseases.** Arch. de Oft. de Buenos Aires, 1931, v. 6, p. 677; 1932, v. 7, Jan. p. 3, Feb. p. 103, Mar. p. 178, April p. 240, May p. 300, June p. 361, Aug. p. 488, Sept. p. 558.

In this monograph published in nine consecutive issues of the same journal, the authors report the fundus findings in patients affected by the following hypertensive diseases: (1) nephritic hypertension, (a) acute glomerulonephritis, (b) subacute glomerulonephritis, (c) chronic glomerulonephritis; (2) pure hypertony; (3) hypertension in arteriosclerosis, (a) without nephrosclerosis, (b) with nephrosclerosis; (4) hypertension in nephritis of pregnancy; (5) hypertension with syphilis.

The clinical study is accompanied by 166 histories. The authors emphasize the importance of studying the eyeground in hypertensive diseases as a means of early diagnosis. A careful study of the vessels is also of great importance from the standpoint of differential diagnosis, and the authors refer to a previous article published in the same journal, in which they classified the sclerosis of the retinal vessels in six degrees, according to the stage attained by such sclerosis.

In the hypertension of arteriosclerosis without renal insufficiency, ophthalmic changes are constant and early, and are found at a stage when few symptoms are present in other viscera. These lesions range from simple loss of color and transparency of the arterioles (at the crossings) to severe hemorrhagic lesions, permitting approximate calculation of the severity of the general disease. In forty percent of the cases sclerotic lesions are observable in the choroidal vessels. The authors consider these of very great importance in diagnosis, serving to distinguish essential arteriosclerotic from nephritic hypertension.

Wilmer, W. H., Pierce, H. F., and Friedenwald, J. S. **The light streaks on the retinal blood vessels.** Trans. Amer. Ophth. Soc., 1932, v. 30, p. 310. (See Amer. Jour. Ophth., 1933, v. 16, June, p. 564.)

11. OPTIC NERVE AND TOXIC AMBLYOPIAS

Arjona, J. **Ocular changes in craneofacial dystrophies.** Arch. de Oft. Hisp.-Amer., 1933, v. 33, May, p. 299.

The subject is reviewed without reporting new cases. The writer believes that intracranial hypertension explains the ocular findings and that the optic atrophies observed are secondary to papilledema which passes unnoted because of the early age of the patients.

M. Davidson.

Bergmeister, Rudolf. **Acute rhinitis as an etiological factor in retrobulbar neuritis and multiple sclerosis.** Wiener klin. Woch., 1933, v. 46, May, p. 556.

In a young woman seventeen years of age, vision gradually became reduced, with concentric contraction and central scotomata, after an acute nasal infection. The vision improved immediately after opening and draining the frontal and ethmoidal sinuses, which had shown thickening of the mucous membrane in the roentgen plates. There was no apparent pathology in the sinuses at the time of operation. About one month later the patient showed nystagmus, weakening of abdominal reflexes, and other symptoms of beginning multiple sclerosis.

The author states that secondary to infection extending from the sinuses there will be at first concentric contraction and later sector and central scotoma, while in toxic retrobulbar neuritis central scotomata are present without concentric contraction of the field.

Beulah Cushman.

Cameron, A. J. **Marked papilledema in pulmonary emphysema.** Brit. Jour. Ophth., 1933, v. 17, March, p. 167.

A coal miner aged thirty-four years had pulmonary emphysema. Two months previously he had noticed defective vision. Right vision 6/6, left 6/12. Fundus examination revealed intense venous congestion of both retinae, and extreme papilledema.

Six weeks later, following rest and

treatment, the condition was markedly improved, but secondary atrophy appeared likely to lead to blindness.

D. F. Harbridge.

Druckmann, A. **Simplified radiography of the optic canal.** Folia Ophth. Orientalia, 1933, v. 1, Feb., pp. 208-211.

The method devised by Rhese-Goalwin for radiography of the optic canal is complicated. The author describes a more simple technique which guarantees a certain and satisfactory picture. The patient lies in a symmetrical abdominal position, forehead and nose touching the plate. The tube is inclined to form an angle of 40°, open forward, with the horizontal plane and is rotated sideways to form an angle of 30°, open upward, with the sagittal plane. The central ray is then directed toward the center of the orbital opening. (Illustrated.) Phillips Thygeson.

Hermann, K., and Freudenthal, E. **A case of optic atrophy in a child.** Zeit. f. Augenh., 1933, v. 80, April, p. 130.

A nine-year-old girl, whose parents were cousins, has a normal body except for hypertrophy of the breasts, but since earliest childhood has had strabismus, bradylalia, disturbances in cerebellar pyramidal innervation, and pallor of the temporal side of the optic discs. Multiple sclerosis could not be ruled out with certainty. Though optic atrophy is not rare in childhood, partial optic atrophy has never been recorded. There are points of similarity to the syndromes described by Behr and by Pelizaens-Merzbacher, but the clinical pictures are not identical.

F. Herbert Haessler.

Knapp, Arnold. **On the association of sclerosis of the cerebral basal vessels with optic atrophy and cupping.** Trans. Amer. Ophth. Soc., 1932, v. 30, p. 343. (See Amer. Jour. Ophth., 1933, v. 16, Feb., p. 184.)

Lees, David. **Observations on the use of tryparsamide in the treatment of syphilitic optic atrophy.** Trans. Ophth. Soc. United Kingdom, 1932, v. 52, pp. 203-216.

Such atrophy is a late manifestation, a progressive devitalization and a gradual death of the nerve cells of the retina and their processes. Of 613 cases of neurosyphilis, forty-eight (eight percent) had optic atrophy. After quoting the results of nearly forty authors on various modes of treatment of optic atrophy, and mentioning the fear with which tryparsamide has been regarded in the United States, the author reviews his results in treatment of 500 cases of neurosyphilis with this preparation. He is satisfied that the visual complications following its use are of minor importance in patients with normal sight. If amblyopia is likely to develop it generally does so during the first four or five injections and it is extremely rare in patients who have tolerated the first five treatments. In only five out of the 500 cases has the author stopped treatment on account of permanent damage to the eye; and he is satisfied that the drug is generally superior to any of the other arsenicals in arresting the progress of syphilis in the nervous system. Care must be used not to give too large a dose, and one must avoid a Herxheimer reaction.

In twenty-one patients suffering from optic atrophy and treated with injections of tryparsamide and bismuth, the progress of the atrophy was apparently arrested for periods varying from over five years to six months. In addition to tryparsamide, systemic syphilis should be treated with bismuth or mercury and the iodides. Each patient must be given the maximum treatment he can tolerate, and appropriate intervals of rest allowed. T. D. Allen.

Ornsteen, A. M. **Amaurotic family idiocy.** Med. Jour. and Record, 1933, v. 137, Jan. 18, p. 64.

Ornsteen gives a discussion of the various abnormalities similar to amaurotic family idiocy, especially Niemann-Pick's disease. Two cases are reported in a family of twelve, the parents being first cousins. The patients showed marked mental and physical changes, lowered vision, and optic atrophy, but normal maculae. (14 references.)

Ralph W. Danielson.

Reese, A. B. **Pigmentation of the optic nerve.** Arch. of Ophth., 1933, v. 9, April, pp. 560-570.

This paper seeks to prove that uveal pigment occurs as a normal variation in the form of chromatophores in the lamina cribrosa and that any manifestation of pigment in the uveal tract may also be encountered in the disc. Three cases of melanoma of the disc are reported. Pigmentation arising from the pigmented epithelium, hematogenous granules, and siderosis are discussed, as are also several conditions simulating pigmented disc. Primary melanosarcoma may occur, but in many instances arises from the choroid adjacent to the disc. Excrescences of pigmented epithelium are at times set free and migrate into the fiber layer of the disc to lie in the stroma. Hematogenous granules, originating from hemorrhage in the vaginal space, may, on the other hand, come to lie in the interstices of the nerve fiber bundles. Siderosis is found occasionally, but usually only after other changes which obscure it. Pigmentation of the disc may be simulated by pigmentation lying in a myopic conus, a deep crater-like hole in the center of the disc, or by contrast with medullated fibers about the disc.
M. H. Post.

Satanowsky, P. **Histologic examination of the neuritis papulosa clinically described by Professor A. Fuchs.** Arch. de Oft. de, Buenos Aires, 1932, v. 7, May, pp. 279-287.

The clinical picture is found in some luetic patients of recent infection. The clinical appearance is that of an exudative papillitis. The author reports the histologic findings in an eye removed on account of syphilitic iridocyclitis with secondary glaucoma. The posterior segment showed the anatomic-pathologic changes which would correspond to Fuchs' clinical description of neuritis papulosa. R. Castroviejo.

Seña, J. A. **The optic canal.** Arch. de Oft. de Buenos Aires, 1932, v. 7, July, pp. 404-435.

Anatomic details are briefly described as well as the technique of radiographic examination, with special reference to the technique of Argañaraz. The author has studied fifty cases. He found two very interesting anomalies: one a supernumerary optic canal located exterior and parallel to the normal optic canal, the other a communication between the optic canal and its sphenoidal sinus. R. Castroviejo.

Vidaur, M. **Observations on serous meningitis.** Arch. de Oft. Hisp.-Amer., 1933, v. 33, March, p. 147.

Three cases are reported which simulated tumor. The dominance of symptoms of general intracranial hypertension over focal signs, the lateness of focal signs, pleocytosis, and absence or mildness of hyperalbuminosis of cerebrospinal fluid are points in differential diagnosis. Lues is an etiological factor, and antiluetic treatment is indicated in all cases. Lumbar puncture is helpful therapeutically. M. Davidson.

Weekers, L., and Hubin. **A contribution to the etiology of hereditary optic nerve atrophy (Leber's disease).** Arch. d'Opht., 1933, v. 50, April, p. 241.

The family tree of a patient affected with typical Leber's disease showed optic atrophy three times where marriages had occurred between two families, designated as A and B. The condition was not present in either family before the intermarriage. Three brothers of family A had married three sisters of family B, and in each case a portion or all of the male offspring manifested typical Leber's disease. The writers believe two hereditary factors necessary for production of Leber's disease. The family trees are given.
M. F. Weymann.

12. VISUAL TRACTS AND CENTERS

Balado, M., and Malbran, J. **Cortical localization of the macula in man.** Arch. de Oft. de Buenos Aires, 1932, v. 7, May, pp. 259-278.

A review of the literature shows that present knowledge as to localization of the macula at the apex of the occipital lobe is based on clinical studies only, without definite anatomic-pathologic examinations.

A case is reported in which a traumatic lesion limited to the apex of the occipital lobe produced central scotoma. Excision of the apex of the occipital lobe was followed by homonymous hemianopsia with the vertical limiting line of the defect passing through the fixation point. Later the line deviated outward, leaving the fixation point untouched. Histologic study was made of the excised portion.

The authors criticize cases of central scotoma reported in the literature in which lesions of the occipital lobe coexisted with basal fracture and lesions of the optic tract elsewhere, which were responsible for central scotoma.

The case reported by the authors seems to prove the theory of Lenz and Monakow as to double macular projection, according to which an isolated lesion at the apex of one occipital lobe cannot produce persistent central scotoma. R. Castroviejo.

Cordes, F. C., and Horner W. D. **Hysteric amblyopia.** Amer. Jour. Ophth., 1933, v. 16, July, pp. 592-597; also Trans. Pacific Coast Oto-Ophth. Soc., 1932, 20th annual meeting, p. 92.

Hilgard, E. R., and Wendt, G. R. **The problem of reflex sensitivity to light studied in a case of hemianopsia.** Yale Jour. of Biology and Med., 1933, v. 5, March, p. 371.

The lid reflex to light was studied in a patient with right homonymous hemianopsia after surgical resection of the left occipital lobe. Lights of 4.8 and 1.0 apparent foot-candles presented in the blind field resulted in no reflex response as measured by reinforcing or inhibiting effect on a following lid reflex to sound. Lights of one thousand apparent foot-candles elicited reflexes when presented in the blind field as measured by this method, but also resulted in perception. The sources of error are discussed, and a method suggested for controlling them.

M. E. Marcove.

Spratt, C. N. **Ocular symptoms arising from intracranial aneurysm of both vertebral arteries.** Amer. Jour. Ophth., 1933, v. 16, pp. 620-621.

13. EYEBALL AND ORBIT

Bedell, A. J. **Unusual case of cyst of the orbit.** Trans. Amer. Ophth. Soc., 1932, v. 30, pp. 388-389.

A woman aged sixty-six years had first noticed a small pea-sized mass near the right tear duct forty years ago. Eight years ago it was as large as a walnut. It was opened and drained, but gradually increased in size until it filled the orbit. After removal it was found to contain a dark brown, oily liquid and an ingrowth of new bone and cartilage. It had destroyed the lacrimal bone, part of the anterior ethmoids, and the frontal bone. The walls of the cyst were composed of dense, chronically inflamed fibrous tissue.

C. Allen Dickey.

Blair, V. P., Brown, J. B., and Hamm, W. G. **Types of reconstructive surgery of the orbital region.** The Southern Surgeon, 1933, v. 1, Jan., p. 293.

The material in this paper concerning epicanthus, depression of the orbit, ptosis, loss of surface skin of the lids, ectropion, contracted sockets, hemangiomas, carcinoma, obliteration of the orbit, and ocular hypertelorism has been largely covered in the American Journal of Ophthalmology, June, 1932, p. 498. (3 references, eight figures.)

Ralph W. Danielson.

Hawthorne, A. T. **Bilateral congenital anophthalmos—with report of a case.** Virginia Med. Monthly, 1933, v. 59, Feb., p. 655.

True bilateral congenital anophthalmos is reported in a child apparently normal in all other respects. The eyelids were perfectly developed but slightly sunken into the orbital fossae. The palpebral fissures were normal, and the lacrimal puncta were present. Inspection of the orbital fossae showed no vestige of eyeball.

M. E. Marcove.

Hippel, E. **Diffuse gliosis of the retina in an eye with microphthalmos.** Graefe's Arch., 1933, v. 129, p. 469.

In a boy child eighteen months old, a microphthalmic eye with exception-

ally small cornea, atrophic iris, and cloudy lens was removed because it was inflamed and painful.

The largest horizontal diameter of the enucleated eyeball was 14 mm. and the greatest vertical was 12 mm. In the posterior part of the eyeball, there was an eccentrically placed growth 7 mm. high and 5 mm. broad. No trace of the optic nerve or retina could be found. The tumor consisted of diffuse proliferation of glia with many blood-vessels resembling arteries, and supplied by several large trunks passing through the coloboma into the tumor mass. The coloboma was characterized by absence of pigmented epithelium and of choroid. There was a defect in the ciliary body but none in the iris. The lens showed a massive capsular cataract and degeneration of the rest of the lens substance. H. D. Lamb.

Hoffmann, Rudolph. **The pathogenicity of bacillus subtilis for the eye.** Zeit. f. Augenh., 1933, v. 80, April, p. 124.

On the basis of one clinical occurrence, some animal experiments, and an examination of the literature, the author concludes that bacillus subtilis is rarely pathogenic for the external eye. When the organism reaches the vitreous it causes acute and stormy pyogenic inflammation resulting in abscess or panophthalmitis, occasionally complicated by ring abscess. In experimental animals the effect is similar, though usually the lesion heals rapidly and the eyeball shrinks. After only a few days the organisms are no longer demonstrable in the eye.

F. Herbert Haessler.

McCool, J. L., and Naffsiger. **Pathologic changes in the orbit in progressive exophthalmos, with special reference to alterations in the extraocular muscles and the optic discs.** Trans. Amer. Ophth. Soc., 1932, v. 30, p. 38. (See Amer. Jour. Ophth., 1933, v. 16, April, p. 379.)

Perrin and Wertheimer. **Pulsating exophthalmos; ligation of internal carotid artery.** Arch. d'Opht. 1933, v. 50, June, p. 395.

A twenty-six-year-old man had pulsating exophthalmos from a head injury about three years previously. He was completely cured by ligation of the internal carotid artery.

M. F. Weymann.

Weekers, L. **Treatment of orbital varicocele, comparative effect of radium and sclerosing injections.** Arch. d'Opht., 1933, v. 50, June, p. 369. (See Amer. Jour. Ophth., 1933, v. 16, June, p. 567.)

Wolfermann, S. J., and Johnson, M. C. **Pulsating exophthalmos.** Amer. Jour. Ophth., 1933, v. 16, June, p. 531.

Wolff, Eugene. **A case and syndrome of recurrent proptosis.** Trans. Ophth. Soc. United Kingdom, 1932, v. 52, pp. 298-307.

The proptosis began before the age of four years. Four attacks occurred, each lasting several weeks to several months. There was always an associated fever. The end result was enophthalmos and atrophy of the optic nerve. A small tumor appeared after one of the attacks at the orbital margin, was excised and found to be a cavernous lymphangioma. Two cases are reported briefly, with discussion of general characteristics of such tumors in other parts of the body. (Bibliography.) T. D. Allen.

14. EYELIDS AND LACRIMAL APPARATUS

Chronis, P. **A radical operation for trichiasis and entropion of the upper lid.** Folia Ophth. Orientalia, 1933, v. 1, Feb., pp. 187-191.

An operation for the relief of severe trichiasis and entropion is described. The stages in the operation are as follows: (1) Canthoplasty. (2) Introduction of the Jaeger plate, incision, parallel to the palpebral border 2 to 3 mm. from the cilia, extending from the inner to the outer angle, and involving only the skin, the latter being lifted up to expose the palpebral muscle. (3) All the fibers of the palpebraris are seized and cut in order to expose the tarsus. The small muscle of Horner is next removed. (4) With a narrow knife thin slices are cut away from the tarsus in

order to make it thin and smooth. (5) Eight to nine sutures are needed, three for the canthoplasty and five to six for the lid. The sutures for the lid are inserted in the following manner: Starting at the inner angle the needle is passed through the skin above the cilia from the outside to the inside without touching the roots: the suture is then passed horizontally through the tarso-orbital fascia. Insertion of the sutures of the canthoplasty. (6) The threads are tied. (7) Intermarginal incision. The lid is stretched over the Jaeger plate and with the point of the knife a marginal incision is made, 1 mm. deep, from one end to the other, behind the cilia at the level of the white line separating the glands from the meibomian orifices. The skin of the lid is left to heal by second intention. Aseptic dressing. Sutures are removed on the third day. The various stages of the operation are illustrated by drawings. Phillips Thygeson.

Corrado, M. **A contribution to the genesis of vitiligo of the lids following repeated instillations of atropin.** Ann. di Ottal., 1932, v. 60, Dec., p. 914.

Vitiligo is characterized by absence of pigment in the skin, which takes on a grayish-white color forming a more or less irregular spot with pigmented margin. Two cases are reported. A child of nine years, in the acute stage of trachoma with corneal complications, developed burning pain and intense photophobia; and the hair over the left temple, the cilia, and the left upper lid became first gray and then milk-white, this decolorization persisting about three weeks. A man of fifty-five years was blind from old trauma following trachoma, staphyloma, adherent leucoma, and so on. In an acute exacerbation during which atropin was used for twenty-five days, the palpebral margin and the ciliae took on a grayish color and then gradually became white. In about fifteen days after replacing the atropin with scopolamin the achromia gradually disappeared. In both cases there was intolerance to atropin and the author believes that the rapid depigmentation was dependent upon sympathetic disturbance produced by the atropin. Park Lewis.

Diaz-Caneja, E. **External dacryocystorhinostomy after the method of Gutzeit.** Ann. d'Ocul., 1933, v. 170, May, pp. 384-414.

It is first insisted that the state of the canaliculi must be known. After the use of x-rays on a good many cases the author concludes that this expensive procedure is not generally necessary but the patency of the canaliculi can be determined by simpler methods. Other contraindications to dacryocystorhinostomy are mentioned, such as tuberculosis and syphilis of the nasal mucosa. The operation is a modification of the Toti method, being a plastic procedure in which the mucous membranes of the nose and the lacrimal sac are sutured together. The particular feature is the use of a small trephine designed by Gutzeit for this purpose. A series of 202 selected cases is reported, none of which showed contraindications before operation. Permanent permeability was obtained in ninety-two percent, while eight percent were not cured.

H. Rommel Hildreth.

Dupuy-Dutemps, L. **Observations on one thousand plastic dacryostomies.** Ann. d'Ocul., 1933, v. 170, May, pp. 361-384.

This is a report on the results of one thousand cases operated on after the author's method, which he first described in 1920. The operation is briefly reviewed, it being a form of dacryocystorhinostomy with an external approach. After the bony opening is made the mucous membrane of the lacrimal sac is sutured to the nasal mucosa, using fine catgut. The overlying skin is closed with silk.

In certain cases the author practices what he terms "secondary incision," which may be repeated several times if necessary. If the new opening becomes obliterated this secondary incision is made through it and is probed frequently, in each case through the lower canaliculus.

There were complete cures in 94.8 percent, with 24 percent only partially

cured, that is, having persistent lacrimation. Only 28 percent were failures, with complete obliteration of the opening; but even in these cases it was unusual to have return of the dacryocystitis.

H. Rommel Hildreth.

Silverman, S. **Microphthalmos with congenital defect of the lacrimal apparatus.** Brit. Jour. Ophth., 1933, v. 17, June, p. 351.

The patient was a premature female who survived three and a half months. What was taken to be an eyeball presented a greyish uniform haze. Postmortem examination showed a cystic structure in the position of the lacrimal sac. A bristle inserted into the upper punctum entered the cavity of the cyst. A bristle in the lower punctum could not be made to enter either the cyst or the nose. The eyeball was considerably smaller than its fellow. This would seem to be an instance of overgrowth and distention of the lacrimal sac.

D. F. Harbridge.

Sisson, R. J. **Concretions in Henle's glands.** Trans. Amer. Ophth. Soc., 1932, v. 30, pp. 527-538.

The author examined these concretions chemically and with the polarizing microscope. He concludes that they consist chiefly of amyloid and crystals, probably an organic compound, and not calcium or cholesterin as is commonly supposed. The history of faulty fat metabolism occurred quite frequently in a series of three hundred cases.

C. Allen Dickey.

15. TUMORS

Cohen, Martin. **Evisceration for hemorrhagic glaucoma, followed by orbital melanosarcoma and metastases resulting in death.** Trans. Amer. Ophth. Soc., 1932, v. 30, pp. 96-102.

A man aged fifty-nine years after occasional attacks of pain in one eye for two years but no impairment of sight, had sudden loss of vision. Examination revealed light perception only and tension four plus. The eye transillumined in all directions, but only a slight fundus reflex was visible owing to cloudy media, evidently due to recent intraocular hemorrhage. A diagnosis of absolute hemorrhagic glaucoma was made and evisceration was performed. The writer first examined this patient one and one-half years later and found in the orbit a hard lobular mass involving the conjunctiva and adherent to the scleral stump. Biopsy proved the diagnosis of melanosarcoma correct. Several months after exenteration, metastatic foci resulted in death. The author advises enucleation rather than evisceration in such cases.

C. Allen Dickey.

Custodis, Ernst. **Malignant melanotic tumor of the iris.** Graefe's Arch., 1933, v. 129, p. 507.

In a fifty-three-year-old chief of police, the uniformly gray iris of the right eye showed a dark grayish-brown compact thickening, involving about one-fifth of the expanse of the iris and extending from the chamber-angle to the pupillary border. Sections from the enucleated eye showed thickening of the affected part of the iris to two and one-half and three times its normal thickness, the anterior layer being composed of a compact net-work of chromatophores. In many places posteriorly, the pigmented cells of the dilator pupillae muscle appeared to have proliferated and to have invaded the neighboring but altered stroma of the iris. The author regards the condition not as melanosarcoma but rather as malignant melanotic tumor whose constituent cells were partly ectodermal and partly mesodermal in origin.

H. D. Lamb.

Hippel, E. **Extension of my sarcoma statistics.** Graefe's Arch., 1933, v. 129, p. 552.

Of 118 cases of ocular sarcoma reviewed by the author, 86 cases came under his own care between 1900 and 1930, and 32 case records were placed at his disposal by colleagues. In 61 of the 118 cases the eye was enucleated in the first stage, in 48 in the second stage and in 9 in the third stage. Of the 61 cases of the first stage, 21 (35 percent) had died from metastasis and 12 (20 percent) from other causes.

Among the 48 in the second stage, 20 (42 percent) had died from metastasis and 11 (23 percent) from other causes. Of the 9 in the third stage, 4 had died from metastasis and 4 from other causes. Of the entire 118, 46 (39 percent) were still alive; in 28 of these the growth had been removed in the first stage, in 17 in the second stage, and in 1 in the third stage. In 11 of the 46 still alive, less than 5 years had intervened since enucleation, in 10 an interval of 5 to 9 years, in 14 a period of 10 to 19 years, and in 11 cases 20 to 30 years. H. D. Lamb.

Krug, E. F., and Samuels, B. **Venous angioma of the retina, optic nerve, chiasm, and brain.** Trans. Amer. Ophth. Soc., 1932, v. 30, p. 330. (See Amer. Jour. Ophth., 1933, v. 16, April, p. 380.)

Ling, W. P. **Ocular neoplasms among the Chinese. Part II, intraorbital tumors, especially cylindromata.** Chinese Med. Jour., 1932, v. 46, Nov., p. 1104.

In the February, 1931, number of the Chinese Medical Journal (See American Journal of Ophthalmology, 1931, volume 14, page 711), the author published a paper on intraocular tumors, the first of a series on ocular neoplasms among the Chinese. The present paper, second in the series, deals with intraorbital tumors. After classifying and enumerating these, Ling reports the two cases of cylindroma in detail and gives critical comments on their nature. (Five references. Ten excellent drawings of sections.)

Ralph W. Danielson.

Mayou M. S. **Blood-staining of the eye associated with a degenerating sarcoma of the choroid.** Trans. Ophth. Soc. United Kingdom, 1932, v. 52, pp. 244-249.

This is an interesting case history and pathological report, accompanied by colored illustrations. T. D. Allen.

Musial, Albin. **A case of fibroma globosum corneae.** Zeit. f. Augenh., 1933, v. 80, April, p. 147.

A child aged one year had a mass in the situation of the left cornea which at first sight impressed one as a staphyloma. In the course of ten months it had grown from a corneal opacity. Microscopical preparations from an excised sector revealed a fibroma. In the few reported cases these tumors seem to have arisen in a scar, but in the present case this could not have been true. F. Herbert Haessler.

Tansley, Katharine. **The formation of rosettes in the rat retina.** Brit. Jour. Ophth., 1933, v. 17, June, p. 321.

This research was divided into two sections: the formation of rosettes in tissue cultures of the retina, and rosette formation in the rat retina in vivo. The technique for making tissue cultures of the isolated undeveloped rat retina is described, and the appearance of rosettes in these cultures reported. Whole embryonic rat eyes can also be cultivated in vitro. Rosettes are formed in the retinas of the younger eyes but not in those of the older ones. Retinal rosettes can be produced in vivo by trephining the undeveloped eyes of young rats soon after birth. The connection between lowered intraocular pressure and the production of rosettes in the retina is discussed.

D. F. Harbridge.

Villard, H., and Dejean, Ch. **Lacrimal adenoma.** Arch. d'Opht., 1933, v. 50, May, p. 348.

Of twenty cases designated as lacrimal adenoma which have been published up to the present time only four or five may be considered as true adenomata of the lacrimal gland. The case added by the writer, of which the report and history appear in this article, may be definitely so classified not only because of the anatomical structure of the tumor, but because of the fact that the mass clinically became engorged under any emotion which produced activity of the lacrimal gland. The growth occurred in a woman fifty-two years of age, and at operation was found to be enclosed in a thin capsule in direct communication with the lacrimal gland. Histologically it was a typical adenoma. (Two microphotographs.)

M. F. Weymann.

16. INJURIES

Casanovas, J. **Atypical scleral rupture.** Zeit. f. Augenh., 1933, v. 80, March, p. 35.

Indirect scleral rupture occurs typically in the anterior segment near the limbus. The atypical ruptures are relatively rare. Those in the anterior segment are difficult to differentiate from direct rupture, and indirect ruptures in the posterior segment are seldom diagnosed until after enucleation. The author reports three scleral ruptures of atypical location. In one of them rupture without trauma took place just behind the insertion of the inferior rectus muscle and became manifest because a swelling developed at the site of the lesion. In the other two the lesion was a complication of myopic posterior polar degeneration. Normal or increased tension by no means rules out scleral rupture nor does emptying of the anterior chamber.

F. Herbert Haessler.

Chase, E., and Merrill, R. H. **A peculiar hole in retina and choroid in the macular region.** Zeit. f. Augenh., 1933, v. 80, March, p. 45.

The authors noted a hole through the entire retina and choroid in the macular region as sharply defined as if it had been made with a trephine. It was observed after trauma in an eye with total excavation of the optic nerve head and increased intraocular tension.

F. Herbert Haessler.

Damel, C. S. **Lashes in the anterior chamber.** Arch. de Oft. Hisp.-Amer., 1933, v. 33, April, p. 194.

An illustrated histologic study of a case of traumatic implantation, ending in plastic iritis and enucleation, leads the writer to the conclusion that there is no relation between the entry of lashes and formation of iris cysts as claimed by others. M. Davidson.

Kegerreis, Roy. **A method for the localization of foreign bodies in the eye.** Radiology, 1933, v. 20, Feb., p. 69.

This is a very technical paper in which the author presents a new teleradiographic triangulation method for the localization of intraocular foreign bodies. The method is compared to that of Dr. Sweet and thirteen advantages over the latter method are given.

M. E. Marcove.

Sena, J. A. **Foreign bodies in eyeball and orbit.** Arch. de Oft. de Buenos Aires, 1932, v. 7, March, pp. 154-167; and April, pp. 214-227.

This paper is a report of statistics of sixty-two foreign bodies found in the eyeball and orbit among ten thousand patients seen in the past two years at the clinic. The cause, form, size, number, and localization of the foreign bodies are discussed, and the importance of good x-ray localization, using the Sweet localizer, for diagnostic purposes is stressed. In cases where x-ray fails to show the presence of a foreign body, chemical analysis of the aqueous humor may show the presence of iron, and therefore of a foreign body, in the eye.

One case is especially emphasized, in which very marked siderosis bulbi was found after a small foreign body had entered the eye nine months previously. The author favors the removal of foreign bodies in the vitreous through incisions made behind the ciliary body.

R. Castroviejo.

Vinsonneau, C. **Pathogenic consideration concerning a case of ocular contusion.** Arch. d'Opht., 1933, v. 50, April, p. 288.

A child ten years of age received a blow in the region of the left eye with a yo-yo, a type of spinning toy. In spite of the fact that the blow seemed very slight as evidenced by a very moderate ecchymosis across the upper lid, there was complete and apparently permanent paralysis to light and accommodation without other evidence of intraocular damage. M. F. Weymann.

Wätzold, Paul. **The question of forcing patients with compensable injuries to submit to operation.** Zeit. f. Augenh., 1933, v. 80, March, p. 7.

Frequently individuals with injured eyes refuse to submit to surgical re-

moval of secondary cataract lest the improvement in vision reduce their compensation. This has occurred with greater frequency since compensation amounting to less than twenty-five per cent has been abolished. (Germany.) The author believes that it should be made obligatory by law either to submit to an operation which is painless and safe as to life, and can be performed under local anesthesia, or relinquish all right to compensation. Optical iridectomy and removal of cataract and after cataract are the operations chiefly in question. Possibly operations for retinal detachment might be included. Operations on muscles to obviate diplopia can be advised only with the greatest caution. A blind and painful eye must be enucleated when its presence is a source of danger to the sound eye. If it is not a source of danger the law should have no right to force enucleation merely to reduce compensation, which is greater for a blind painful eye than for one that is only blind. F. Herbert Haessler.

Weymann, M. F. **Argyrosis of the conjunctiva.** Trans. Amer. Ophth. Soc., 1932, v. 30, pp. 538-547.

After experimentation on rabbits the author treated two cases by injecting 0.6 c.c. of a fresh mixture consisting of one part of twelve percent sodium thiosulphate and two parts of two percent potassium ferricyanide solution. The reaction is very mild and a sufficient amount of the pigmentation is removed to secure a suitable cosmetic result. C. Allen Dickey.

17. SYSTEMIC DISEASES AND PARASITES

Bourne, M. C. **The effect of diet on the nature of the ocular lesions produced by naphthalene.** Brit. Jour. Ophth., 1933, v. 17, April, p. 210.

This work encountered difficulties and remarkable variability of the effects produced by naphthalene feeding. Early experience demonstrated that the ingestion of naphthalene was not inevitably followed by the formation of cataract; upon this observation the character of diet influencing naphthalene ingestion in the production of cataract was investigated. The type of ocular lesion produced in rabbits was found to depend upon the diet. In animals feeding upon oats and cabbage, crystals were laid down on the retina. Retinal exudates sometimes appeared, but were limited in extent and never became confluent. Either the lens was completely protected, or the changes do not advance beyond the stage of early peripheral striae. This protective effect is believed to be due to the cabbage.

On diets of bran and carrots, or of oats, bran, and carrots, extensive retinal exudates and lens changes leading to complete cataract were produced. Retinal crystals were never observed on these diets. In a few cases there was rapid death of the animal without the occurrence of any lesion except slight swelling and haziness of the lens.

The toxic effects of naphthalene in the absence of cabbage are described; and the results of post-mortem examination are given. The optimum conditions for the production of cataract by naphthalene are suggested.

D. F. Harbridge.

Clark, C. P. **The ocular disturbances in epidemic encephalitis.** Amer. Jour. Ophth., 1933, v. 16, July, pp. 606-611.

Denti, A. V. **The syndrome of the nasal nerve.** Rassegna Ital. d'Ottal., 1933, v. 2, nos. 1-2, pp. 32-42.

Denti reviews in great detail the anatomy of the nasal nerve. The syndrome consists of pain, rhinorrhea, and lacrimation. The ocular picture includes conjunctivitis, epithelial keratitis, ulcerative keratitis with hypopyon, iritis, and cyclitis. The symptoms of the syndrome of Meckel's ganglion are excluded by the presence of definite ocular pathology, by the presence of hypersensitive areas in the skin of the face, by absence of Sluder's sign, and by complete remission of symptoms upon cocainization of the anterior portion of the nasal mucosa. Two cases are reported in detail. Eugene M. Blake.

Friedenwald, J. S. **Concerning allergy and immunity in ocular tuberculosis.**

Trans. Amer. Ophth. Soc., 1932, v. 30, p. 269. (See Amer. Jour. Ophth., 1933, v. 16, April, p. 361.)

Lugli, L. **The ocular lesions of experimental avitaminosis.** Rassegna Ital. d'Ottal., 1933, v. 2, nos. 1-2, pp. 43-68.

Lugli studied four groups of rats fed on MacCullom's diet, deficient in vitamin A. One eye of each animal was protected from external irritation by median tarsorraphy. The experiments demonstrated (1) endophthalmitis, (2) colorless mucous secretion, (3) epithelial lesions in the form of incipient keratinization, (4) turbidity of the aqueous from inflammatory reaction in the iris, and (5) incipient vascularization of the cornea. When complete closure of the eye was obtained, the metaplasia of the corneal epithelium was characteristic but without ulceration or perforation. The latter conditions result from secondary infection. (Histological and slit-lamp illustrations.)

Eugene M. Blake.

Puscariu, E. **Observations on rare cases of ocular syphilis.** Ann. di Ottal., 1932, v. 60, Dec., p. 901.

Primary syphilitic involvement of the external tissues of the eye is said to be commoner in Russia than elsewhere, owing to the not infrequent practise of removing foreign bodies from the eye with the tongue. This report includes four cases of syphiloma affecting respectively the ocular conjunctiva and the eyelid at the ciliary border, and two cases of papillary syphilide, in the form of gumma, one affecting the tarsus (most exceptional). Three even less frequent cases of ulcerative conditions from heredosyphilis are described, and one case of inflammatory or neoplastic formation of the orbit, a pseudotumor. Several of the author's cases illustrate the special difficulty of follow-up work among the population in which he practices.

Park Lewis.

Swab, C. M., and Gerald, H. F. **The ophthalmic lesions of botulism: additional notes and research.** Brit. Jour. Ophth., 1933, v. 17, March, p. 129.

Swab outlined a series of experiments on animals with a view to deciding whether or not lesions of the visual pathway result from the toxin of clostridium botulinum. Gerald studied the toxicological aspect of the toxin produced by the bacillus botulinus. The animals used were dogs, cats, rabbits, guinea-pigs, albino rats, cocks, and frogs. The results are illustrated by graphs and photomicrographs. Botulinus toxin is a protoplasmic poison to peripheral nerve and striated muscle tissues, although more selective in its action upon the former. It is also probably a general protoplasmic poison. (Twenty references.)

D. F. Harbridge.

Urbanek, J. **Ocular tuberculosis.** Trans. Ophth. Soc. United Kingdom, 1932, v. 52, pp. 227-240.

The author uses Toeniessen's tebeprotein instead of Koch's O.T., and gives simultaneously three dilutions and a control. He chooses for therapy one-tenth the amount of the smallest dose which gives a reaction. Such treatment continuously and over a long period of time has given very satisfactory results in scrofulous keratoconjunctivitis, sclerosing keratitis, scleritis and episcleritis, retinal periphlebitis, thrombosis of the central vein, and neuritis and retrobulbar neuritis when of tuberculous origin.

T. D. Allen.

18. HYGIENE, SOCIOLOGY, EDUCATION, AND HISTORY

Alvaro, Moagyr. **Prevention of blindness.** Rev. de Ophth. de São Paulo (Brazil), 1933, v. 2, March, p. 179.

This is a review with special application to conditions existing in Brazil.

Chance, Burton. **Dr. Randall as an ophthalmologist.** Amer. Jour. Ophth., 1933, v. 16, June, p. 504.

Dixon, P. K. **A focus of trachoma, heretofore unreported.** Rev. Internat. du Trachome, 1933, v. 10, July, pp. 142-145.

Dixon states that in recent monographs on trachoma no mention is made of a focus existing in central Africa. The author, situated in the province of Katanga, Belgian Congo, found that thirty-seven of the patients presenting themselves because of eye disorders

were affected with trachoma. Among trachomatous individuals twenty percent had pannus and thirty-six percent trichiasis. The focus of the disease appears to be rather sharply limited to the valley of Luapula and to the banks of Lake Moero. There is a distinct familial distribution and one village may be heavily infected while the next is free.

Phillips Thygeson.

Gabriélidès, A. **The progress of ophthalmology in Greece from 1835 to 1932.** Folia Ophth. Orientalia, 1933, v. 1, Feb., pp. 143-156.

The scientific ophthalmological movement in Greece began with the foundation of the Athens Medical Society in 1835, the opening of the ophthalmological clinic "Ophthalmiatron" in 1855, and the creation of a chair of ophthalmology at the university in 1856. The foundation of the journal "Asklepios" contributed greatly to the diffusion of medical knowledge in general and ophthalmology in particular. At present scientific instruction in ophthalmology is available in Greece, and since 1923 new ophthalmologic units and clinics have been created under the direction of the Ministry of Hygiene. In 1932 the Greek Ophthalmological Society was founded.

Phillips Thygeson.

Johnson, G. L. **Insurance value of one or both eyes.** Arch. of Ophth., 1933, v. 9, April, pp. 538-539.

The author protests against the compensation rating of one or both eyes established by law in England and some of the colonies. The compensation allowed is 375 pounds, for one eye and 750 pounds for both. The ratio of value should be far less for one eye and far greater for both. No account, furthermore, is taken of the type of employment. In many occupations very little disability follows loss of one eye, while in others total incapacity may result. The value of the eye lost also varies somewhat according to occupation.

M. H. Post.

Junès. **The school and the campaign against trachoma.** Rev. Internat. du Trachome, 1933, v. 10, July, pp. 154-168.

Junès offers in detail suggestions for the campaign against trachoma in Tunisia. He believes that the disease may best be studied and treated in the schools, since it is manifestly impossible to reach the entire population. It is among the children that one encounters the greatest proportion of active disease and it is in the school that they can most satisfactorily receive the daily treatment required. The school is also the best agent for education and for antitrachomatous propaganda. Junès concludes that it is not necessary to separate infected from noninfected children, since contamination is usually familial and only exceptionally scholastic.

Phillips Thygeson.

Meissner, Max. **An ophthalmologist's notes in an institute for the blind.** Zeit. f. Augenh., 1933, v. 80, March, p. 48.

In a school for the blind, seventeen out of seventy-nine had cataract. Two family trees are reproduced. In one of them twenty-four of forty-seven members, representing five generations, were afflicted with cataract. Of the seventeen inmates with cataract six were operated upon successfully, and five were not surgically treated. Four were operated upon bilaterally with resulting total blindness, and two were operated upon unilaterally and enucleation became necessary. In one patient the lesion may have resulted from intrauterine roentgen injury, the mother having been irradiated when four months pregnant for eczema under the left breast. About one fourth of the inmates were not totally blind. Under ideal conditions these should be cared for in a school for the visually handicapped, so that they will be prepared for normal life. F. Herbert Haessler.

Parker, W. R. **The teaching of ophthalmology in this country.** Arch. of Ophth., 1933, v. 9, April, pp. 515-522.

This paper constitutes an analysis of the author's investigation of the teaching of ophthalmology to undergraduate and postgraduate students in Great Britain, her Colonies, and North and South America. The subject was assigned to him in preparation for the International Congress of Ophthal-

mology, 1933. It has been recommended by the Council of Medical Education of the American Medical Association that the minimum number of hours should be fifty, divided as follows: lectures, fifteen; clinic, fifteen; section work in hospital and dispensary, twenty.

Eleven countries were included in the report. The average total number of hours varied from 24 to 139. The Indian schools, nineteen in number, were especially notable for the large number of hours. There was considerable variation in the relation of lecture to clinic hours. Evaluation of postgraduate instruction is difficult. Certain internships in hospitals and assistantships in clinics are doubtless quite satisfactory, but only those centers where systematic instruction is given in addition to clinical training are considered in this report. These are: University of Colorado, University of Iowa, Johns Hopkins, Massachusetts Eye and Ear Infirmary, University of Michigan, and University of Pennsylvania. There is great variation in the programs followed by these different institutions. M. H. Post.

Rabello, Aristides. **Ancient and modern oculists.** Rev. de Ophth. de São Paulo (Brazil), 1933, v. 2, March, p. 176.

This is a rather amusing discussion of professional standards in Brazil. The author says there are old oculists at the age of twenty-five years and new oculists at the age of seventy years. He characterizes a large eye clinic in Rio de Janeiro as belonging to the pretonometric epoch; says that in that clinic glasses are ordered without examination, the patient being given a pair of plus 2.00 spheres for convergent strabismus and minus 2.00 spheres for divergent strabismus, no correction being given for astigmatism; and so on.

W. H. Crisp.

Raganeau. **Etiologic considerations of trachoma among the Alaouites.** Rev. Internat. du Trachome, 1933, v. 10, Jan., pp. 25-32.

Trachoma has been common among these peoples since antiquity. According to a legend the unpopular sultan Ibrahim of Djeblé, king of Persia, launched an anathema against his people and their offspring. The country remains the crossroads of the Near East and is traversed by the merchants of Palestine, Egypt, Liban, Syria, Irak, Kurdistan, Armenia and Turkey. Climate and altitude appear to play no part in the severity or frequency of the disease. Poor hygiene is common in the country and in the cities. Flies and insects abound and the kéfié, a headdress which completely envelops the head and falls down over the shoulders, is probably concerned in the spread of the disease, the ends of this covering being used to wipe the eyes.

Dust and sand are important in that they traumatize the eye and render it more vulnerable to infection.

Phillips Thygeson.

Raganeau. **Focus of trachoma among the Alaouites.** Rev. Internat. du Trachome, 1933, v. 10, Jan., pp. 20-25.

The Alaouite territory is one of the four principal states under French mandate in the Near East. Of 14,911 inhabitants examined by Raganeau 6,564 were found to be trachomatous. The author believes that many diseases such as syphilis, malaria, and tuberculosis increase the susceptibility to trachoma, this explaining the intensity of the disease in certain foci. (See also abstract of same author's paper in Folia Ophthalmologica Orientalia.)

Phillips Thygeson.

Steiner, W. R. **Elisha North of New London, Connecticut, the founder of the first eye infirmary in the United States.** Trans. Amer. Ophth. Soc., 1932, v. 30, pp. 374-386. A biography.

Strathearn, J. C. **The problem of blindness in Palestine.** Folia Ophth. Orientalia, 1933, v. 1, Feb., pp. 121-141.

Part 1 of this article (part 2 to follow in the next issue) is mainly statistical and gives figures of blindness among the outpatients of the British Ophthalmic Hospital during the last thirteen years and also figures derived from intensive study of all the inhabitants (10,850 persons) of ten selected Pales-

tinian Moslem villages. The incidence of blindness is twice as high in the southern as in the northern part of the country, being in inverse proportion to the rainfall. A classification of the probable causes of blindness indicates that by far the greatest proportion of blindness arises from conjunctivitis. The rôle of trachoma in the causation of blindness is discussed and the author concludes that this disease is a relatively minor factor. The relation of fundus diseases, glaucoma, cataract, injury, and fevers, to blindness is discussed and analyzed. As a result of compulsory vaccination smallpox no longer needs consideration as a cause of blindness. The incidence of ophthalmia neonatorium is quite negligible. Phillips Thygeson.

Thomson, Ernest. **The organization and the administration of school ophthalmic clinics in the county of Lanark.** Trans. Ophth. Soc. United Kingdom, 1932, v. 52, pp. 258-278.

The author writes fully of the difficulties inherent in organization of clinics in the country (in Scotland); of refraction, of furnishing and checking the spectacles ordered, of giving treatment both operative and nonoperative, and of the relationship between the school staff and family doctors, teachers, and ministers of religion. T. D. Allen.

Zachert, M. **The problem of trachoma in Poland in comparison with that of neighboring countries.** Rev. Internat. du Trachome, 1933, v. 10, April, pp. 82-86.

Poland is surrounded on all sides by countries having high incidence of trachomatous infection. The author believes that the increase of the disease in Poland during and after the war was due largely to dissemination from Russia, where the trachoma index varies from ten to thirty percent. In 1930 the trachoma index of Poland was found to be 1.55 percent. Recent control measures, which include 347 antitrachomatous dispensaries, two sanatoria, two mobile hospital units, and numerous ophthalmic clinics, are expected to reduce the incidence of the disease.
Phillips Thygeson.

19. ANATOMY AND EMBRYOLOGY

Moreno, J. **The ciliary zonule.** Arch. de Oft. Hisp.-Amer., 1933, v. 33, April, p. 235.

By special staining methods, the writer's studies show the postequatorial fibers to be inserted continuously and evenly; and not, as even the latest anatomy of Testut describes it, in bundles. The anterior and posterior zonular fibers constitute impermeable membranes, as shown by injection of colored fluids into the anterior chamber and into the intrazonular space. The latter is thus a closed canal, hence the term "intrazonular canal" is proposed. For Petit's canal the term "retrozonular" is proposed to avoid confusion. Other experiments show the fibers of the zonule to be joined by a viscous agglutinating substance. No relation has been demonstrated between zonule and vitreous except that of contact. Rupture of the hyaloid membrane is therefore not the consequence of intracapsular extraction. The conclusions are that the zonule is an ectodermic, exoplastic intercellular formation from the pars ciliaris retinæ, that the zonular lamella is a product of the zonular fibers, that the zonular ligament constitutes the posterior wall of the posterior chamber, that the posterior chamber recess of Kuhnt ends in a cul-de-sac at the level of the external third of the ciliary process and not in front of the ora serrata as usually stated, that fuchsin is the best coloring agent for its study, that biomicroscopy fails to demonstrate the interfibrillar agglutinant, and that in general it also fails to show the true structure since it is only available in pathological or abnormal cases. (Many colored illustrations.) M. Davidson.

Sondermann, R. **Contribution to knowledge of the development of the choroid.** Graefe's Arch., 1933, v. 129, p. 596.

The developmental processes in the choroid correspond entirely in essential elements with those of the ciliary body. Aside from the simple inner layer of the later choriocapillaris, all the primary capillaries surrounding the optic vesicle become obliterated and dis-

appear. In their place arises the outer layer of the choroid, through differentiation of mesenchymal cells and perhaps also in part from the loosened endothelial cells of the capillaries. Into this outer part of the choroid, between the end of the fifth and end of the sixth month, grow the larger vessels from the posterior pole of the eye. These vessels become continuous at the ora serrata with those of the vascular layer on the inner side of the ciliary body, while at the same time the connection of the latter with the choriocapillaris is lost. The muscle fibers of the ciliary body end for the most part at the ora serrata. More rarely they extend into the beginning of the choroid and isolated fibers extend to the equator.

H. D. Lamb.

NEWS ITEMS

News items in this issue were received from Drs. F. B. Fralick, Ann Arbor, Michigan, S. L. Olsho, Philadelphia, and M. F. Weymann, Los Angeles. News items should reach **Dr. Melville Black, 424 Metropolitan Building, Denver,** by the twelfth of the month.

Deaths

Dr. James Flandreau Van Fleet, New York; aged forty-three years, died, June 5th.

Dr. Theodore Eugene Oertel, Augusta, Ga.; aged sixty-nine years, died, June 27th.

Mr. J. Herbert Fisher, London, England, died April 4th. He was well known to the various visitors at Moorfields hospital.

Dr. Theodore C. Lyster, Los Angeles; aged fifty-eight years, died August 6th of acute heart disease.

Societies

An Eye Section, open to all members of the Philadelphia County Medical Society, has been organized, with Drs. Charles R. Heed, chairman, and Sidney L. Olsho, secretary. Scientific meetings will be held on the second Tuesday evening of each month from October to May.

A probable repercussion of the political upset in Germany is the decision of the president of the German Ophthalmological Society to postpone until next year the regular meeting of the Heidelberg Congress, which was to have been held at Heidelberg in the early part of August. The German Ophthalmological Society no doubt contains a goodly number of Jewish colleagues and of others who have become more or less an anathema to the present political régime.

At the 1933 meeting of the Pacific Coast Oto-Ophthalmological Society held at San Francisco under the presidency of Dr. Hans Barkan on June 28, 29, and 30, the following officers were elected for the coming year: A. W. Morse, of Butte, Montana, president; H. G. Merrill, of Provo, Utah, first vice-president; Lawrence G. Dunlap, of Anaconda, Montana, second vice-president; and Frederick C. Cordes of San Francisco, California, secretary-treasurer. The 1934 meeting will be held in Butte, Montana.

The scientific presentations on the ophthalmological program were: The electric cautery in treatment of corneal ulcer, by A. W. Morse; Observations on hole in the macula, by J. W. Crawford; Angioid streaks in the retina, by A. B. Dykman; The Toti-Mosher operation and its end results, by R. C. Martin; Clinical characteristics of the ocular myopathies seen in thyroid disorder, by Howard Naffziger and O. W. Jones; and The present status of retinal detachment operations, by Dohrmann Pischel. The unbounded hospitality of the San Francisco members offered as amusements, golf, motor trips through Chinatown and San Francisco, a dinner-dance, and last, but not least, the unscientific session held after the annual banquet at the Bohemian Club.

This meeting was opened by an invocation by the chaplain, Dr. Isaac Jones, of Los Angeles and Inferior California, the latter term being introduced by the president, Dr. Hans Barkan. The unscientific session was a parody on the morning scientific session and the talent displayed by the San Francisco members who staged this sketch would have caused them to be snapped up immediately by theatrical scouts, had there been any in the audience. A motion picture on cataract extraction in which the vitreous squirts to the ceiling on delivery of the lens by Dr. Cordes, who assayed the rôle of a visiting European ophthalmologist; and a radio broadcast of a tonsil operation in the Pasadena Rose Bowl by Dr. Bud Horner as Graham McNamee were high spots of the evening. Dr. George Hosford as the Japanese guest of honor and Dr. Dohrmann Pischel as the nervous young doctor presenting his first paper also proved themselves to be actors of starring caliber. Even the San Francisco climate was on its good behavior for the occasion and everyone was sorry to have to go home. (Ed—Needless to explain that this note was submitted by a correspondent from Southern California!)

At the afore-mentioned meeting a Western Ophthalmological Society was formed, with Dr. John E. Weeks, Portland, president and Dr. Edward Jackson, Denver, vice-

president and secretary. The first meeting will be held at Butte, Montana, at the same time as that of the Pacific Coast Oto-Ophthalmological Society. The exact date is not yet determined but will probably be early in July, 1934.

Miscellaneous

At the last meeting of the American Medical Association the section on ophthalmology discontinued the Presessional Volume. A Presessional Bulletin was sent out instead, which contained a program with short abstracts. This was done as a measure of economy and, as far as we have been able to learn, the change of plan was favorably received.

The Colorado summer course in ophthalmology and otolaryngology was held in Denver, July 17-29. A different plan was adopted this year, the first week being devoted wholly to the eye and the second, to the nose, throat and ear. Men from thirteen states were in attendance. Dr. Lawrence T. Post of Saint Louis was the guest of honor at the Congress, which was held on July 21. A banquet was given at the University Club on that evening and, following it, the Colorado Ophthalmological Society held a special meeting, presenting one of its regular clinical programs.

The Research Study Club of Los Angeles will give its third annual midwinter course from January 15 to 26, 1934. The guest lecturers in ophthalmology will be Professor A. Elschnig of the German University Eye Clinic, Prague, Czechoslovakia, and Dr. Hans Barkan, professor of ophthalmology at Stanford University Medical School, San Francisco. The ophthalmological lectures and clinics will mainly be held in the mornings and will cover principally the field of traumatic and operative surgery of the eye. On alternate days a roundtable discussion on ophthalmological subjects will be held. The guest lecturers in otolaryngology will be Dr. John Barnhill, Miami, Florida; Dr. E. C. Sewall, San Francisco; and Dr. Harry L. Baum, Denver, Colorado. Dr. Barnhill's main course will be one of dissection and surgery on the cadaver. The otolaryngological subjects will be principally confined to the afternoons so that participants in the course may cover the entire field without overlapping. The fee for the entire course will be fifty dollars. Further information and a detailed program may be obtained by addressing the secretary, Dr. Don Dryer, 2007 Wilshire Boulevard, Los Angeles, California.

The Conrad Berens Ophthalmological Foundation was left $50,000 by will of the late John Markle of New York.

Personals

Dr. John T. Stough has been promoted to instructor in ophthalmology in the Division of Biological Sciences, University of Chicago.

Dr. Maynard M. Greenberg has been promoted to instructor in ophthalmology at Creighton University School of Medicine, Omaha, Nebraska.

Drs. Julius H. Gross and Emmett P. North have been made assistant professors of ophthalmology at the St. Louis University School of Medicine.

Dr. F. Bruce Fralick, Ann Arbor, has been appointed associate professor and acting head of the department of ophthalmology, University of Michigan, on a part time basis.